TECHNOLOGY DEPT.

Gas Journal

VOL. 280. 106TH YEAR. LONDON, NOVEMBER 24, 1954 NO. 4773. PRICE 1/3

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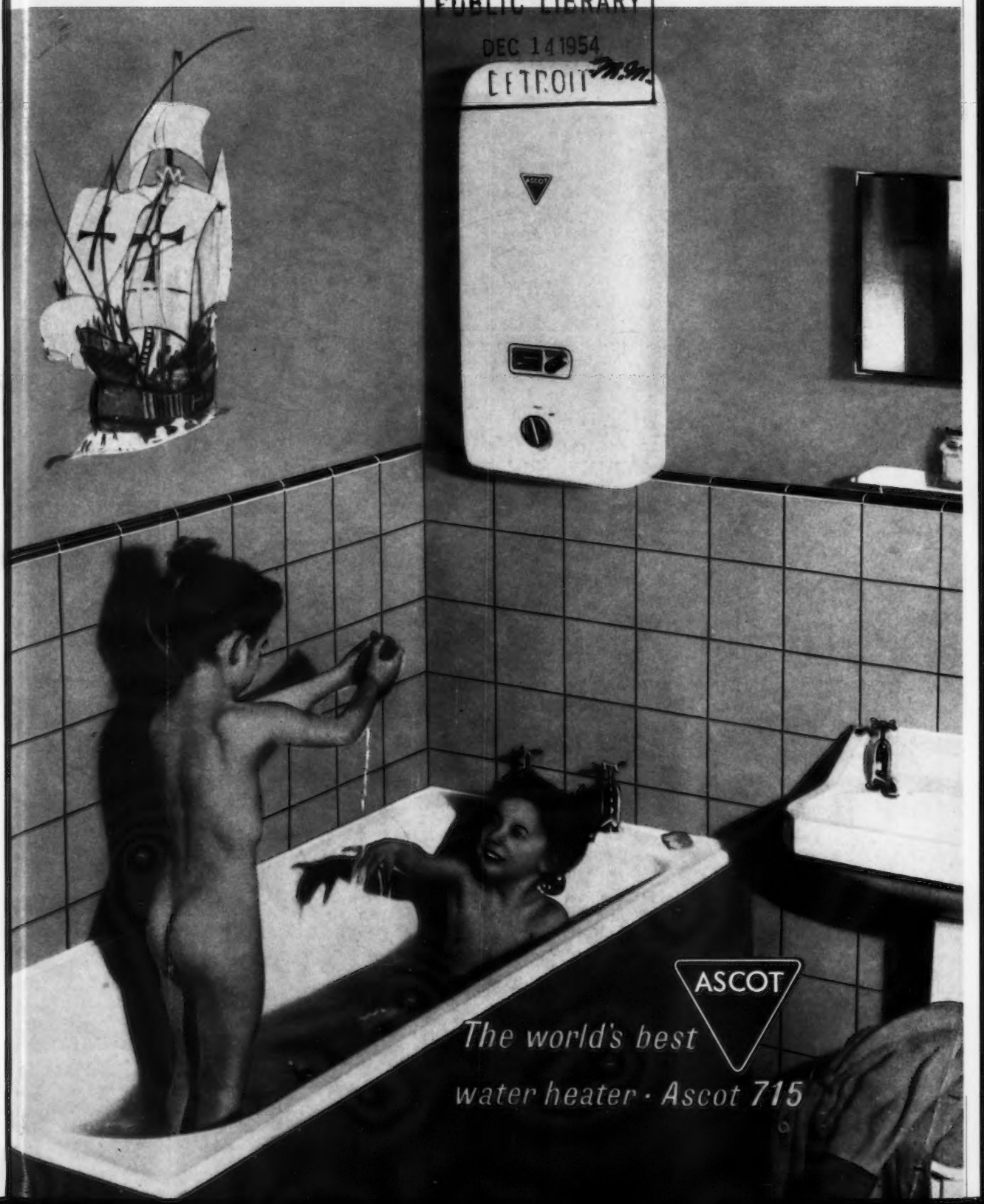

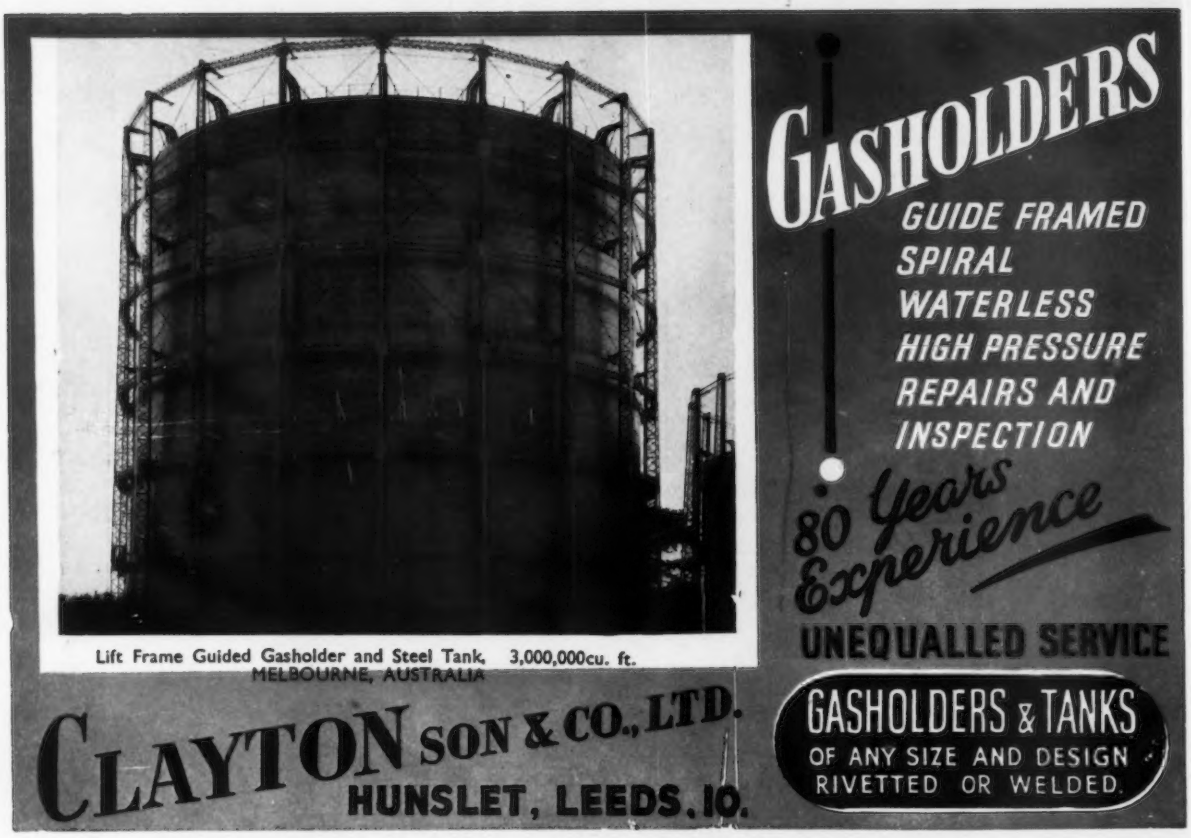

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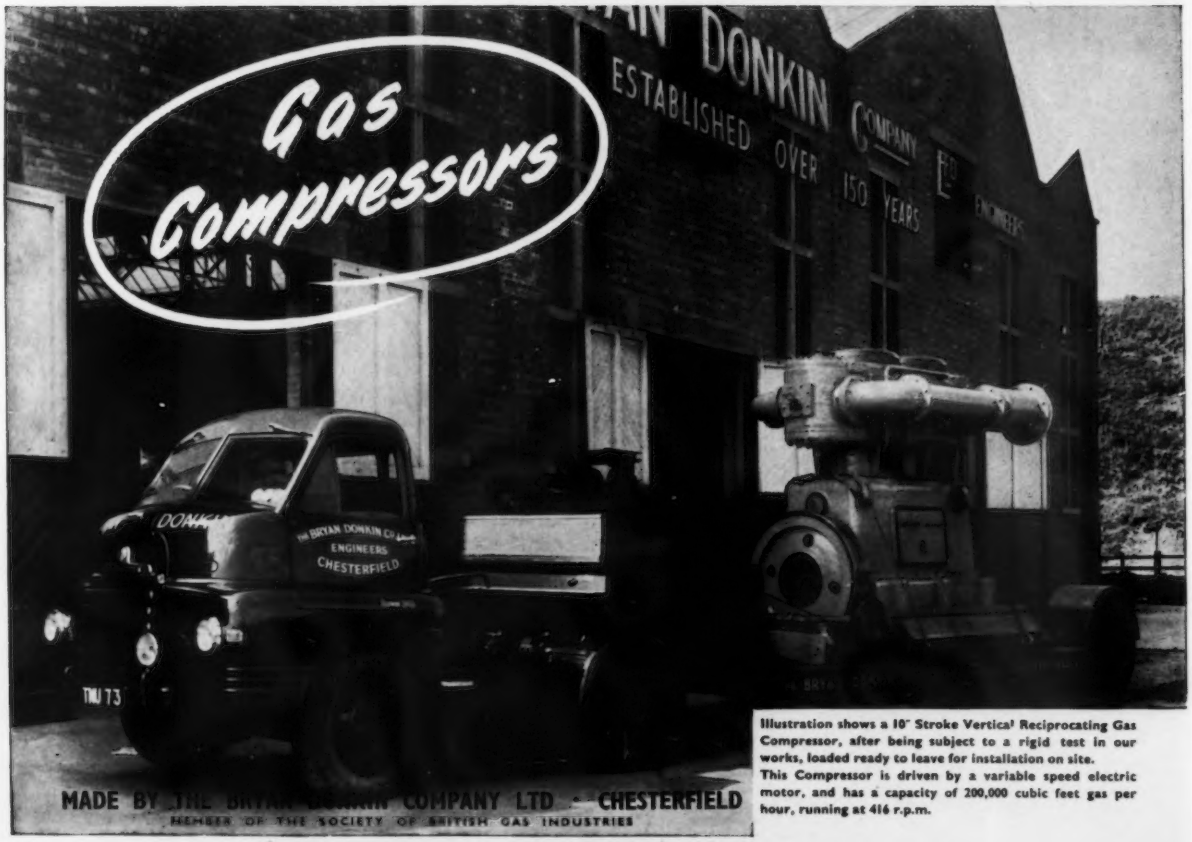

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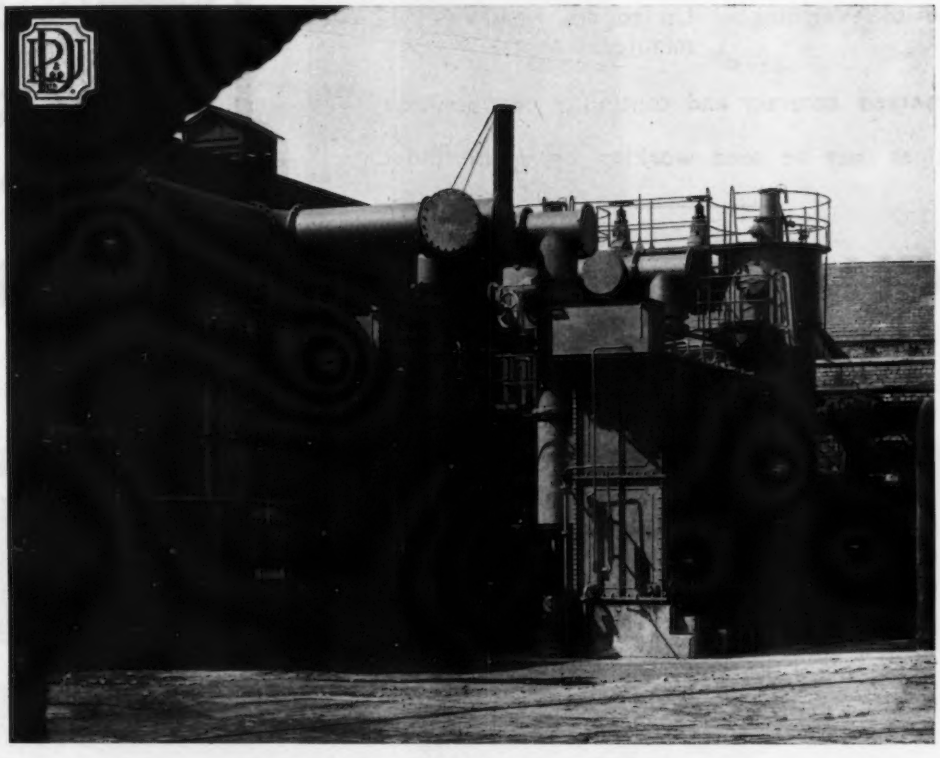

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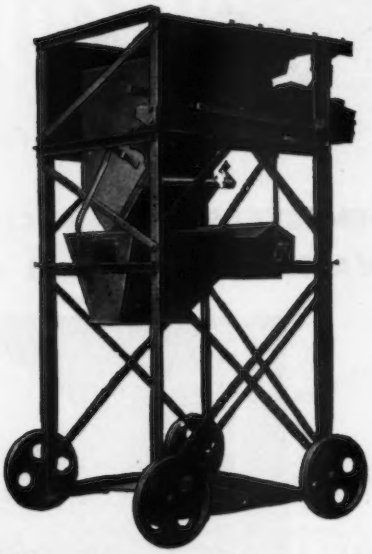

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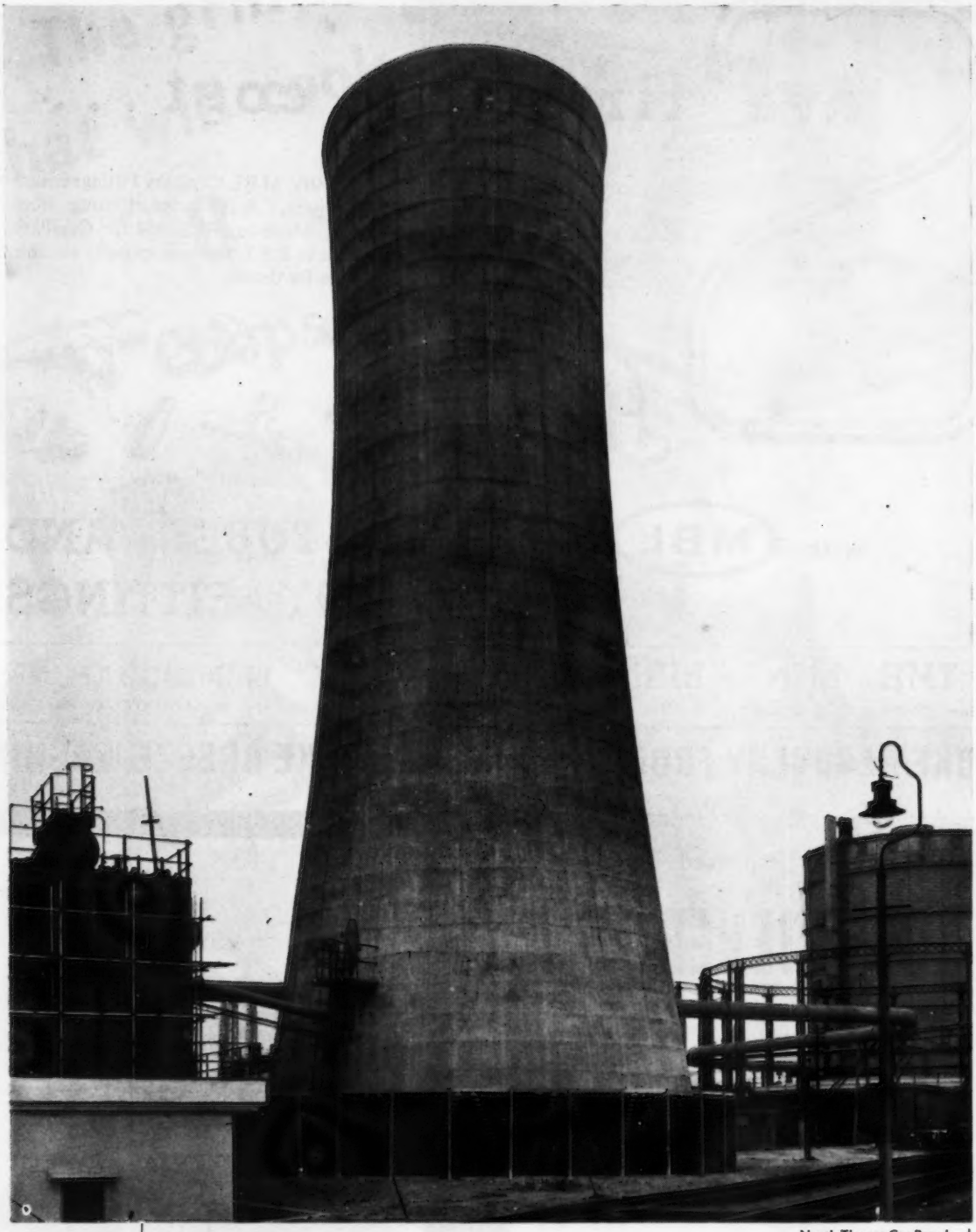

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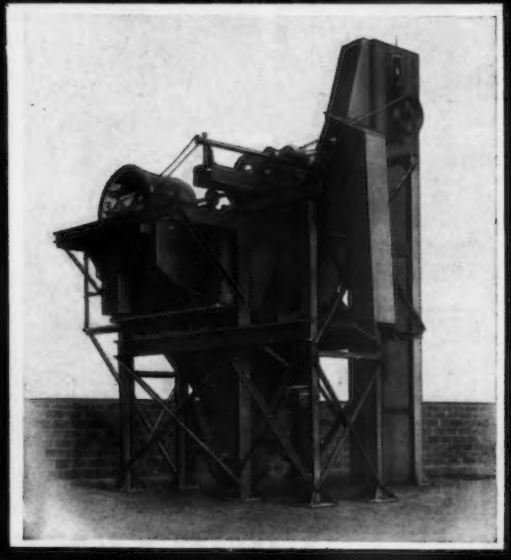

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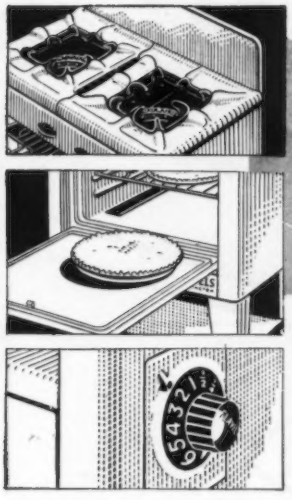

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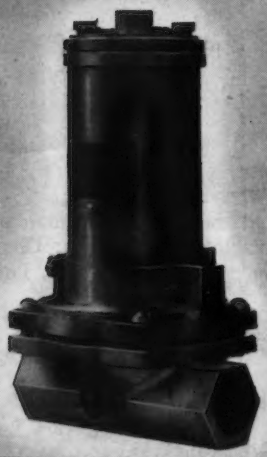

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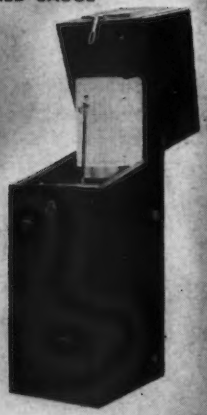

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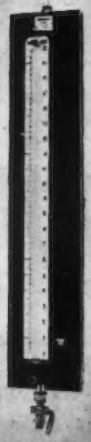

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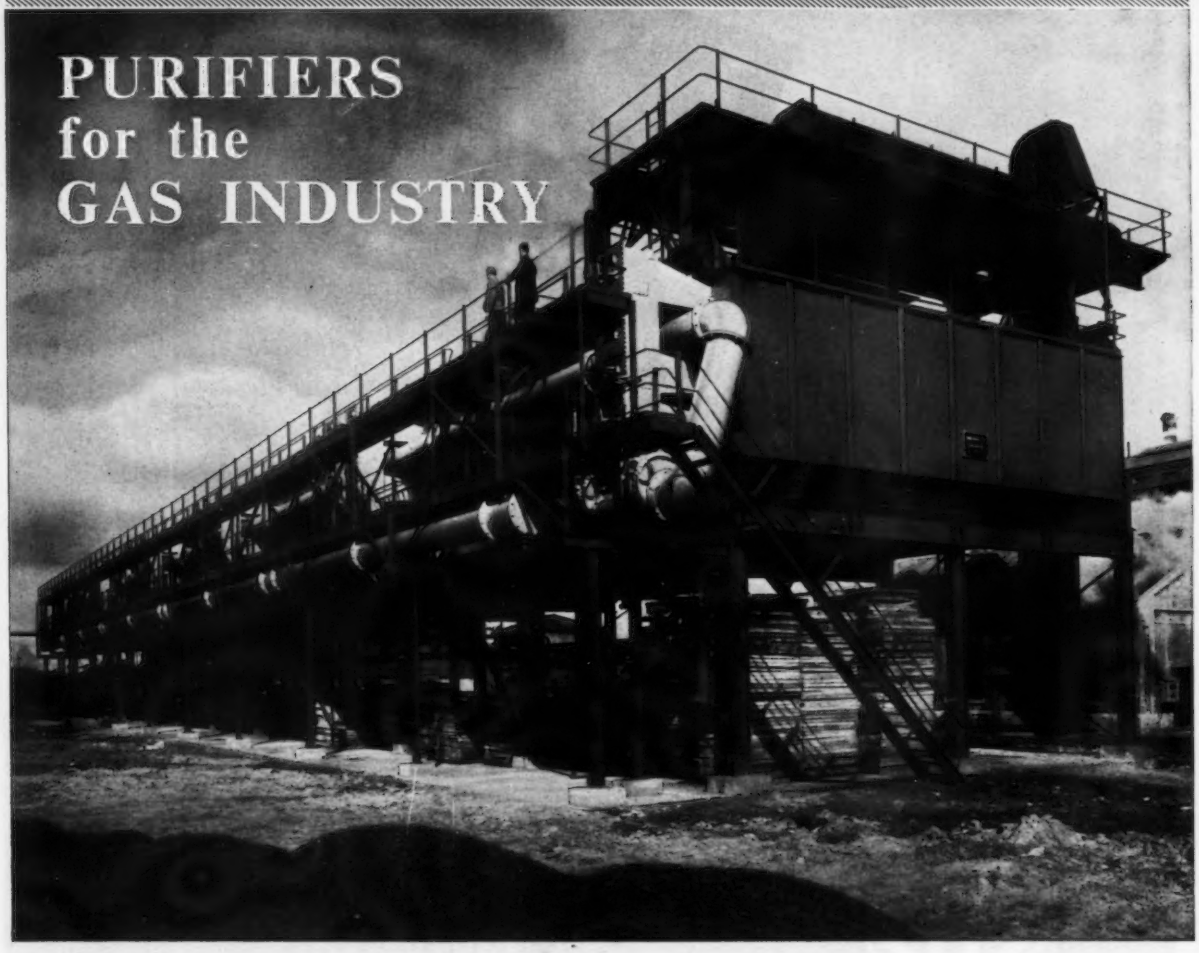

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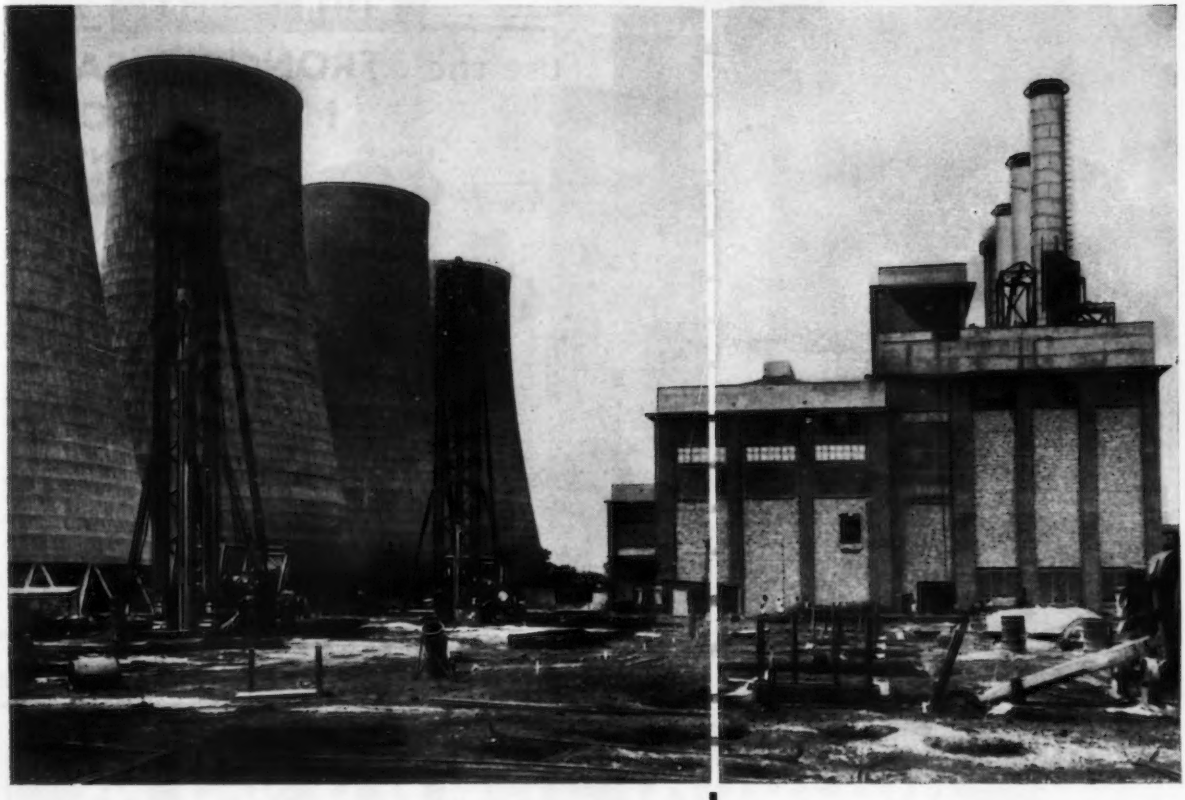

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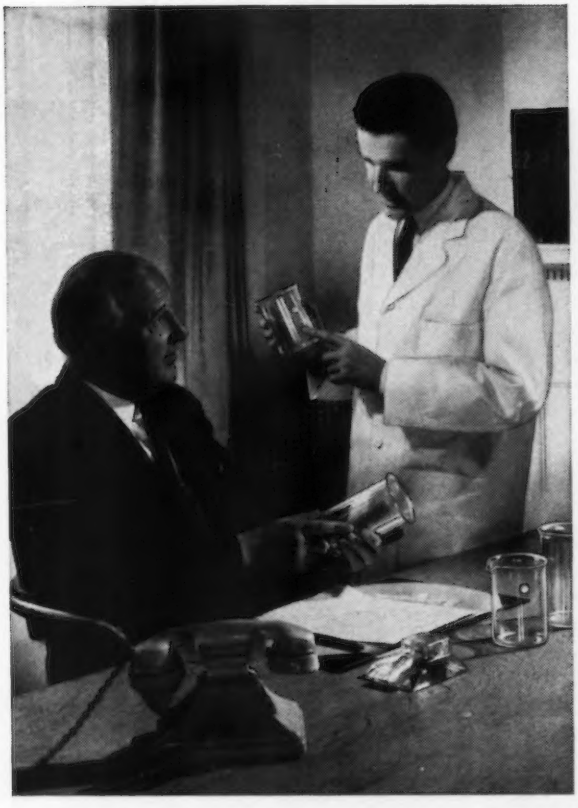

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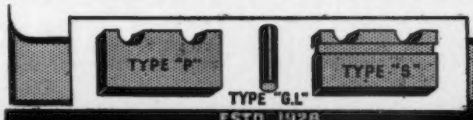

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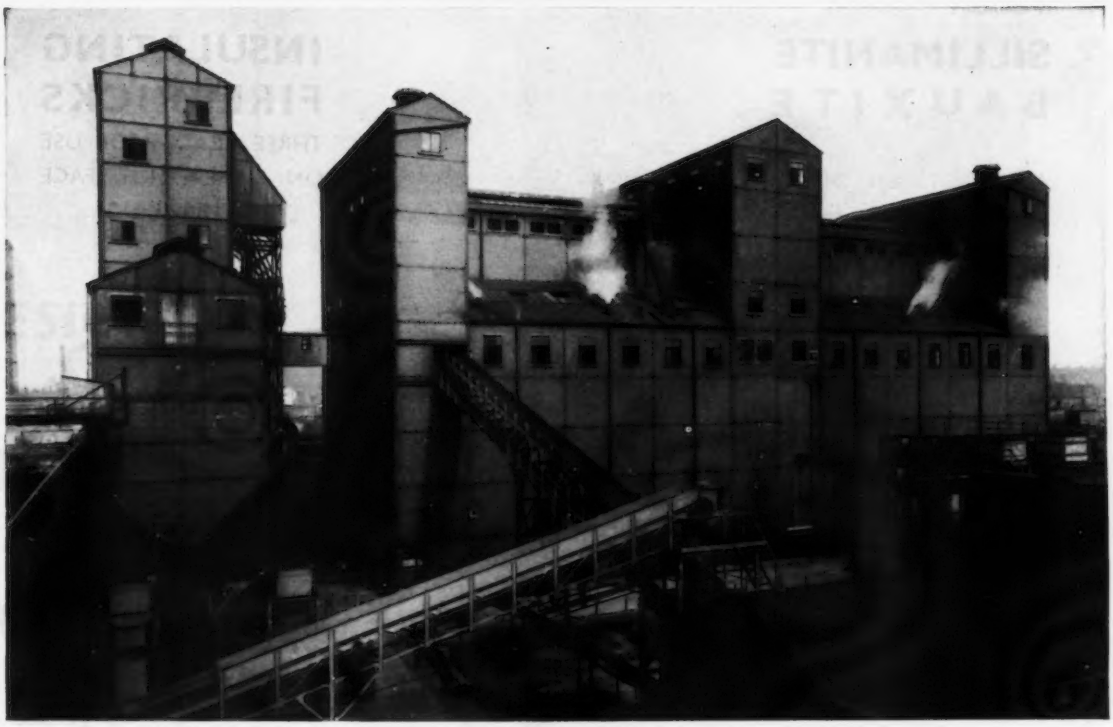

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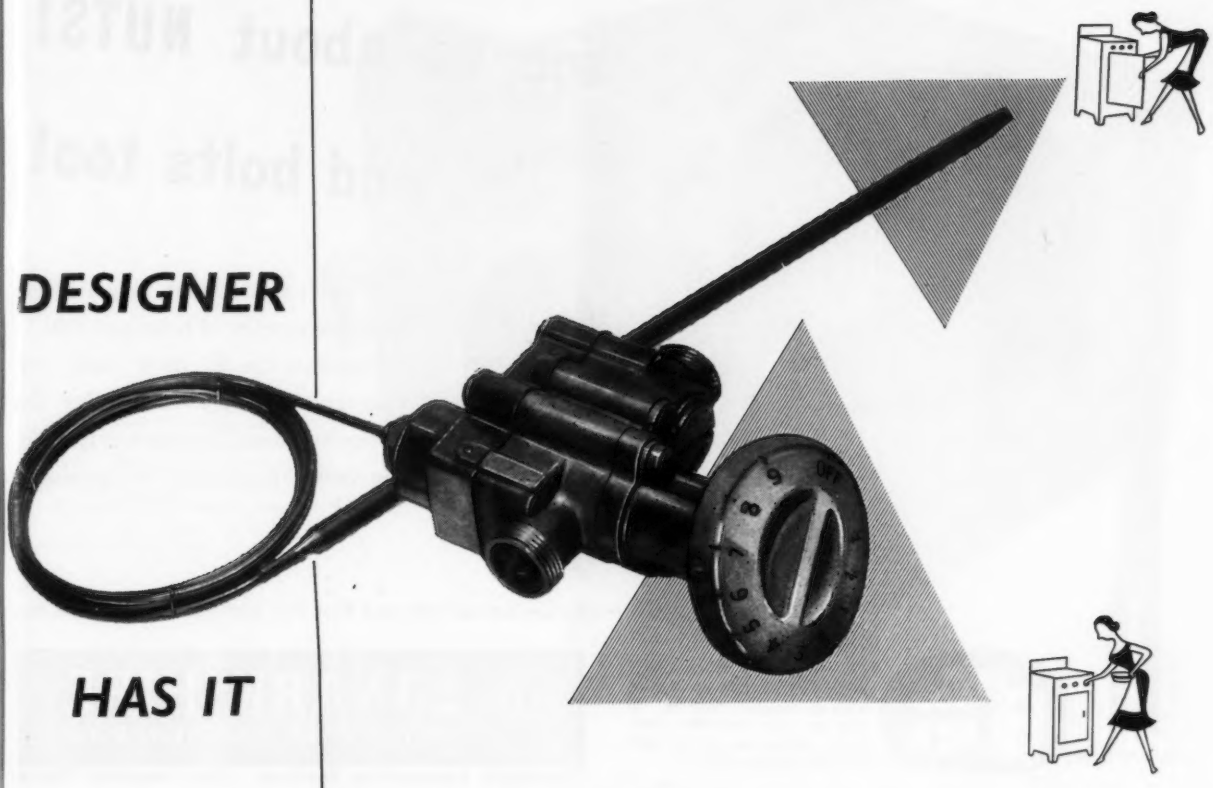

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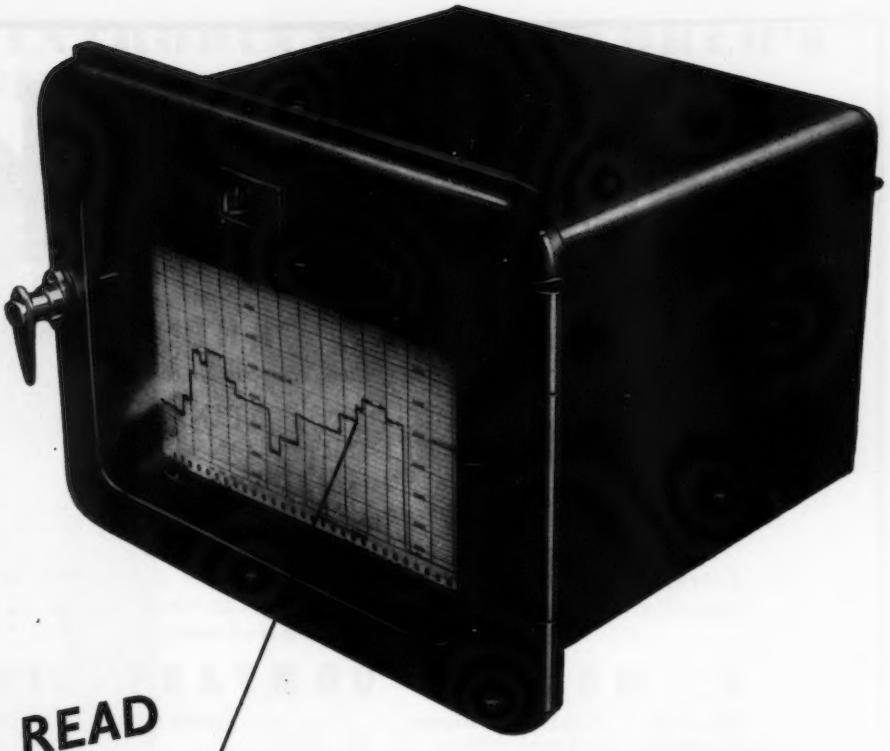

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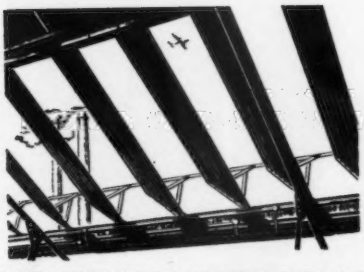

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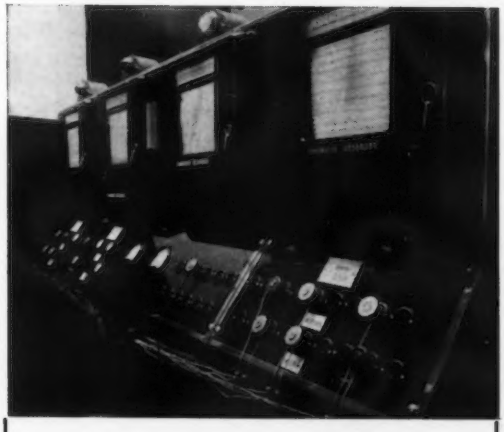

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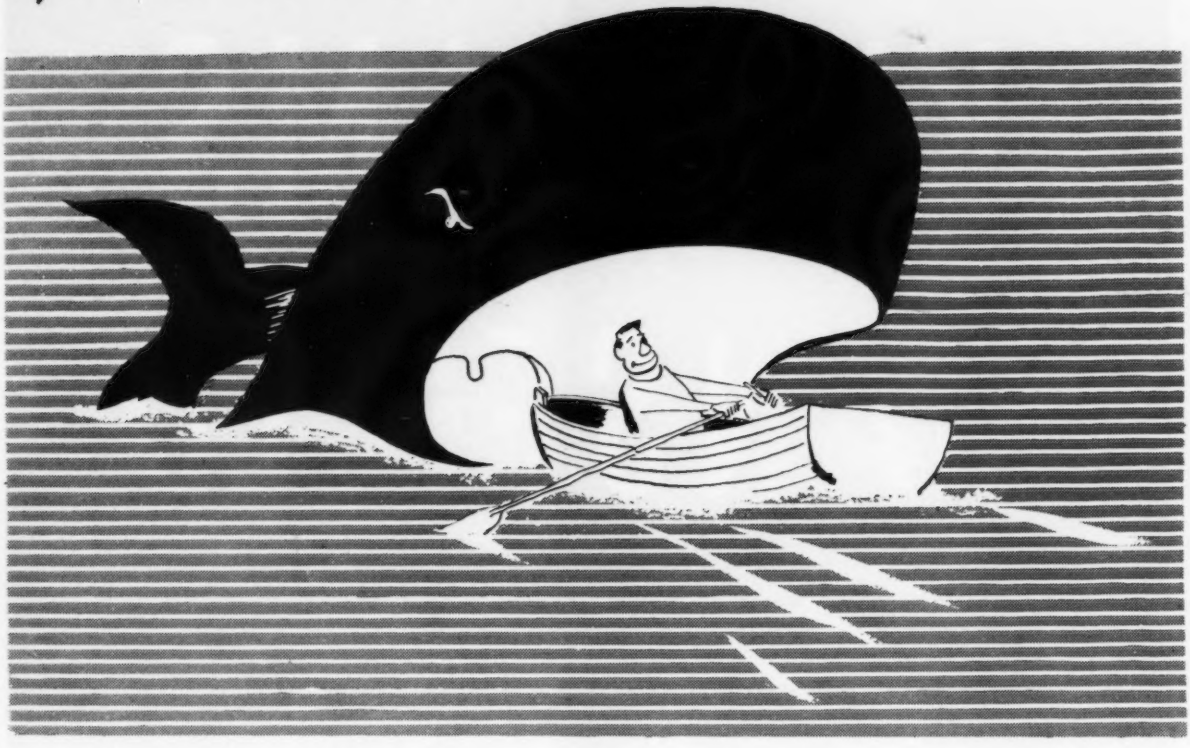

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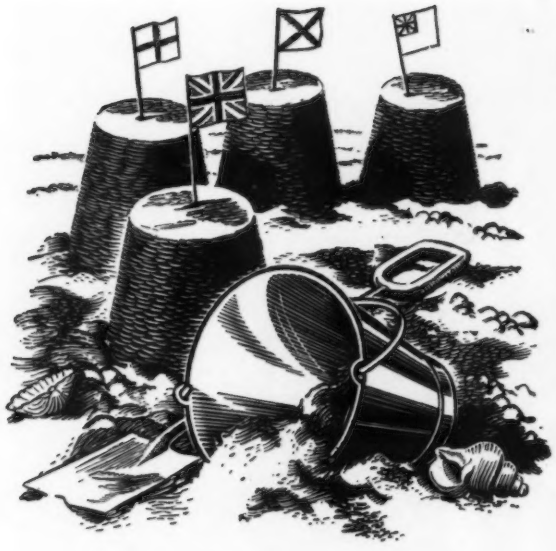

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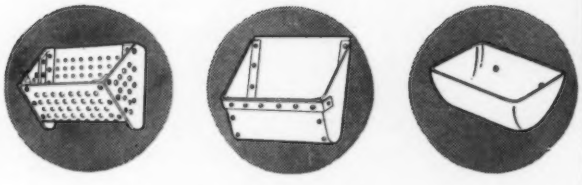

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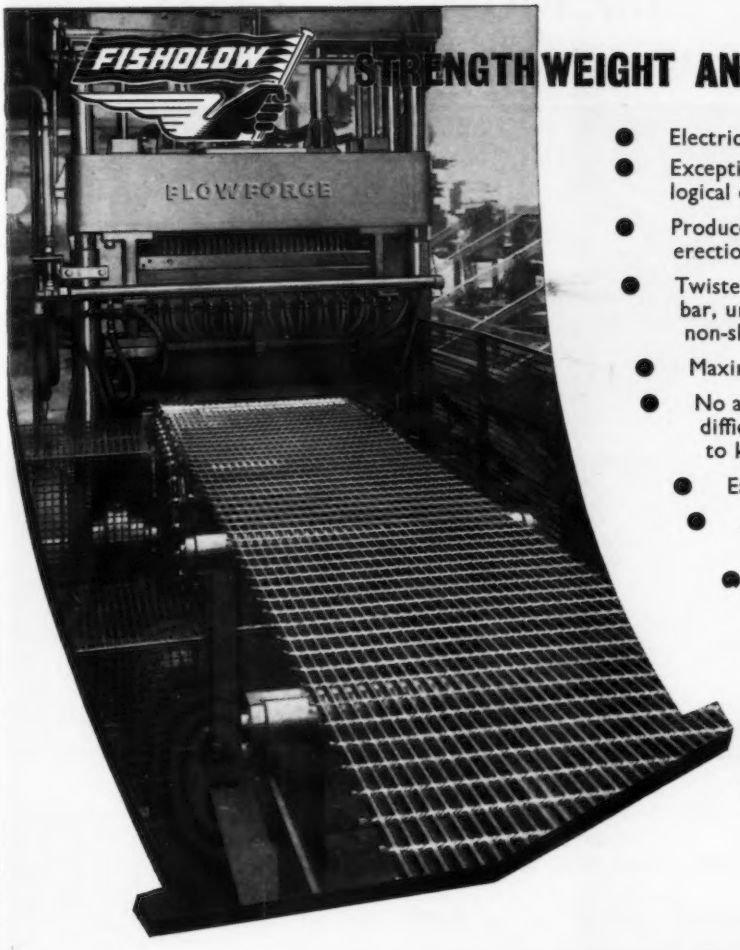

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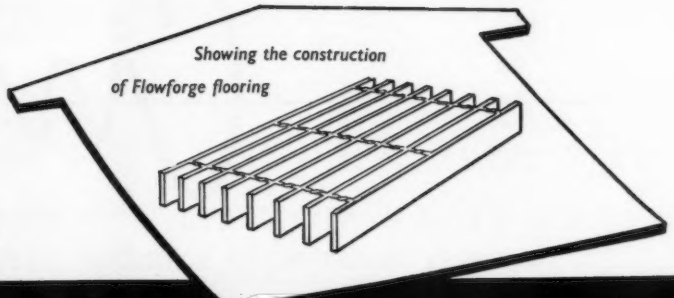

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106th YEAR

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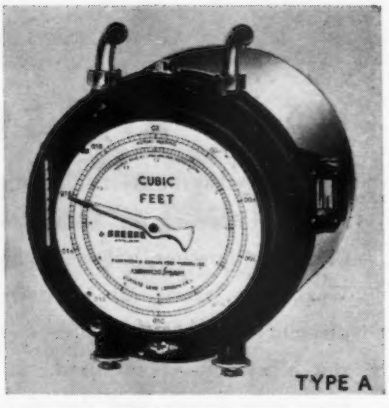

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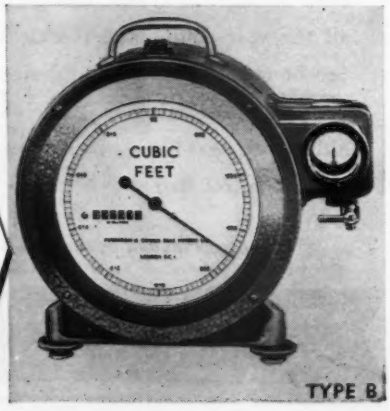

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VOLUME 280 . No. 4773. NOVEMBER 24, 1954. 106th YEAR

Fuel and a Royal Occasion

NOVEMBER is with us again and also two events that are usual to the time of the year. One of these is looked forward to with pleasurable anticipation by all associated with the fuel industries while the other is dreaded by each and every one of us. The first event is, of course, the annual dinner and dance of the Institute of Fuel, the second—need we mention it—the onset of fog, that hardiest of hardy annuals and most dangerous of enemies to health and property. This year both occurred on November 18 when the Institute of Fuel held its function in a London which, earlier in the day, had been shrouded in a blanket of smoke-laden mist.

It was obvious though, that however murky and depressing it might be outside, inside the building where the function was held, all was gay and festive with the assembled company intent on enjoying a happy and memorable evening. For this function was not as other previous ones of its kind—it was indeed a 'Royal Occasion.' Some time ago His Royal Highness the Duke of Edinburgh graciously consented to accept Honorary Membership of the Institute of Fuel but due to the interposition of other events had been unable to receive his scroll of membership until last Thursday. The annual dinner provided a suitable opportunity for the presentation and, in consequence, the Duke honoured the company by attending for this purpose. It is well-known that the Duke of Edinburgh has the most lively concern for all matters affecting the welfare of this nation and that he is particularly interested in the technical and economic development of our industries, on which development our future prosperity depends. His acceptance of Honorary Membership of the Institute and his presence at its chief social function of the year was thus, not only a high compliment to the Institute itself but also a source of encouragement to all in the fuel industries to give of their best in the service of the nation.

In his speech after accepting the scroll the Duke of Edinburgh said that the proper use of fuel and the prevention of waste were essential to our economy and could do a great deal in 'cleaning up much of the muck which passes for fresh air in most of our cities.' So far as he could make out it was essential in this country, if one wished to draw attention to a given problem, to start a row or controversy about it. He did not wish to start a row or get involved in an argument, but the Institute might possibly take the hint. Nowadays one heard a lot about encouraging miners to produce more coal but it seemed to him that the best encouragement that could be given to the miners was to let them see that coal is not being wasted. Oil was being used to an increasing extent, but he thought it was just as important that there should be proper use of oil as that there should be proper use of coal.

The Duke's apt reference to 'the muck which passes for fresh air in most of our cities' had a special significance when one considered the state of the atmosphere outside the very building in which he spoke, and we could not help feeling, as we listened to his words, that if ever the need was brought home for burning smokeless fuels wherever possible and for the efficient use of fuels in general, it was on this occasion. Among the smokeless fuels which are already at our disposal gas and coke can claim a very important place and it was good to see so many representatives of the gas industry present, including, at the high table, the President of the Institution of Gas Engineers. Perhaps it might not be amiss if we in the gas industry took the Duke's hint to the Institute as applying equally to ourselves. Certainly the gas industry has an answer to quite a number of problems concerning the most efficient use of our coal resources and the abolition of smoke and, if we understood the royal hint aright, it implied that we should seize every opportunity of acquainting the general public and the 'powers that be' of these facts. Certainly, it seems to us that a vigorous and uncompromising statement of the indispensability of gas and coke in the pursuit of fuel efficiency cannot be made too often.

At another point in his speech the Duke referred to the National Industrial Fuel Efficiency Service (N.I.F.E.S.) and said that he hoped it would have 'a sharp cutting edge.' In our first leading article last week we dwelt at some length on the importance of gas as a fuel in industry, particularly for refined heating processes; we also mentioned the need for continued encouragement and effort in this field. The peculiar advantages of gas in many types of heat treatment are widely recognised by industrialists and the industrial sections of the Gas Council and the area boards are clearly intent on exploiting to the full these possibilities, the importance of which can hardly be overestimated.

It may be remembered that the Minister of Fuel and Power, Mr. Geoffrey Lloyd, said during the recent debate on the annual reports and statements of accounts of the gas and electricity industries, that while 'coal is carrying the massive fuel load of the country, gas and electricity form, so to speak, the cutting edge by which industry advances its productivity.' If we consider these two references to the cutting edge, firstly of fuel efficiency and secondly of industrial productivity, we may conclude that the gas industry is entitled to consider itself perhaps the most effective whetstone on which [N.I.F.E.S. and industry in general may sharpen their effectiveness.

Stafford—a Sign of the Times

A SUBTLE change has taken place in recent years in the production methods employed by the gas industry of this country. The grave difficulties which have afflicted the industry since the war in regard to supplies of sufficient and suitable coals are only too well known by all those that have tried to cope with an increasing demand for gas and, at the same time, a falling off in the quantity and quality of coal supplied. In fact, dire necessity has forced the industry to turn away from its traditional raw material to an ever increasing extent in order to meet its obligations. Whereas oil, for instance, was once, and not so very long ago, used only for 'topping up,' it is now becoming a bulwark, one might even say a 'lifesaver' to the industry.

It is significant that the oil industry did not take long to assess the fuel trends in this country which resulted from war-time loss of coal markets abroad and the consequent dwindling of the coal mining population. Enormous new refineries have been erected in this country with a view to treating crude oil here in Britain instead of in remote parts of the world. The obvious implication of this policy is that the oil industry considers it likely that suitable markets are to be found in this country not only for the light and medium fractions, but also for the heavy fractions of the distillation processes, and not only temporarily but on a long-term basis.

In assessing the future coal position in Britain, the gas industry has been as swift to read the portents as has the oil industry. It has seen clearly that the prospects of good gasmaking coals ever becoming really plentiful again are remote and that the time for palliative measures is past. Consequently, new methods and new raw materials for gasmaking have been vigorously sought and fortunately with considerable success. As might be expected the gas industry in this country has turned to its sister industries in other countries which have experienced a similar shortage of suitable carbonising coals, and it has benefited considerably from their earlier efforts to solve the problem. Amongst the methods adopted on the Continent for making gas from materials other than coal is the straight gasification of oil by catalytic means, and in the forefront of such processes is the O.N.I.A.-G.E.G.I. process developed in France. This process, which was developed by Office National Industrie de l'Azote (O.N.I.A.) in collaboration with Gaz à l'Eau et Gaz Industriel (G.E.G.I.) was put into operation at Cahors where results were promising. For some time the West Midlands Gas Board has taken a live interest in catalytic oil gasification having erected an experimental regenerative plant for this purpose at Solihull. More recently this board has built a further catalytic oil plant, this time of the O.N.I.A.-G.E.G.I. non-regenerative type, at Stafford works. A description of this later plant, which was inaugurated last Friday, is given on page 531 of this issue.

The West Midlands Gas Board is to be congratulated on its initiative in establishing the first full-scale plant of this type operating on heavy oil in this country. It will be some time, no doubt, before any definite long-term appraisal of the economics of the process can be made, but results suggest that it will have definite advantages where the cost of coal is high. At any rate, it is considered from figures already obtained that the cost per therm of gas produced will be considerably less than that for carburetted water gas.

American Gas Sales

ACCORDING to a report on gas requirements and supplies just published by the American Gas Association, sales of gas by utilities and pipelines in the United States in 1957 will aggregate 74.3 billion therms (an American billion equals 1,000 mill.), an increase of 31.5% over actual sales of 56.5 billion therms in 1953. Supplies of gas from existing and planned facilities to meet these increased requirements will total 81.6 billion therms, an advance of 20.7% over total supply of 67.6 billion therms available last year. To meet increased demands for service, the gas industry will require 4.6 mill. tons of steel pipe during the 1954-57 period inclusive. Of this amount 2.9 mill. tons will be in the form of 16 in. diameter and over, primarily used for gas transmission lines. An additional 134,000 tons of steel in other forms and 446,000 tons of cast iron will be required by the industry in the 1954-57 period.

Anticipated residential space heating requirements in 1957 will exceed those experienced in 1953 by 53% and will represent nearly one-fourth of total annual demand of all customers of the industry in 1957. Residential space heating customers will aggregate 16.9 mill. in 1957, equivalent to a gain of 32% over the total of households heated with gas at the end of 1953. Peak day requirements for residential space heating are expected to increase 44% during the four years under review, to total more than 214 mill. therms during the 1957-58 heating season. Residential base load consumption on an annual basis is expected to increase 20% between 1953 and 1957, while commercial and firm industrial consumption will advance 29% and 27% respectively.

The A.G.A. report provides comprehensive forecasts of national and regional statistics on an annual basis through 1957 and on the peak day through the 1957-58 heating season. Data shown relate to the entire industry and are based on replies to questionnaires from 159 gas companies, representing 87% of industry sales. The report is a continuation of the survey originally undertaken by the Gas Planning Division of the Petroleum Administration for Defence, and was sponsored by the A.G.A. Committee on Economics. The complete report is obtainable from the A.G.A. Bureau of Statistics at a cost of $2.

Personal Notes

MR. J. DEAN, Secretary of A.P.V.-Paramount Ltd., the foundry subsidiary of the A.P.V. Co., Ltd., at Crawley, Sussex, has been appointed a Director of the Company as from November 1.

MR. C. WHITEHEAD, Works Manager at the Middlesbrough unit of the Northern Gas Board, has been appointed Assistant Engineer and Manager of the Hereford District, West Midlands Gas Board.

SIR GEOFFREY VICKERS, V.C., has informed the Minister of Fuel and Power, Mr. Geoffrey Lloyd, that for personal reasons he wishes to resign his membership of the National Coal Board as from February 28 next. Mr. Lloyd, in accepting Sir Geoffrey's resignation, has expressed gratitude for the services he has rendered since 1946 when he first became associated with the Board.

MR. ROBERT AIR, Distribution Foreman at Cowdenbeath, has been made an Hon. Member of the Scottish Junior Gas Association (Eastern District). The honour is in recognition of his long service as a member of the Association of which he was President in 1948. Mr. Air has completed over 50 years service in the gas industry and has intimated his intention to retire at the end of the year.

MR. E. C. MENGEL, Chairman of Humphreys & Glasgow, Ltd., and Mr. G. G. FARTHING, Joint Managing Director, were involved in a car accident on their way back to London from the opening of the oil gasification plant at Stafford on Friday, and both sustained injuries which necessitated their removal to a hospital at Nuneaton. Mr. Mengel is still in the hospital, but Mr. Farthing was well enough to return home during the week-end.

MR. E. C. THOMAS has been promoted to the position of Distribution Engineer to the Portsmouth, Gosport and Bognor Regis Gas Undertaking in succession to MR. G. C. WARNE, whose appointment as Engineer and General Manager to the Isle of Wight Undertaking was reported recently. Mr. Thomas poined the former Portsmouth Gas Company in 1928, where he served first in the Engineer's Office and subsequently in various other departments before he was appointed Assistant Distribution Engineer in 1947.

MR. R. E. ONIONS, Manager at Alfreton for the East Midlands Gas Board, received the good wishes of the members of the staff on his retirement after 44 years in the industry, and was presented with a lounge clock. He was a native of Loughborough, Leics., where his father, the late Mr. E. Onions, was for 34 years Engineer and Manager of Loughborough Corporation Gas Department and spent altogether 51 years in the industry. Mr. Onions decided to follow in his father's footsteps, and in 1910 he started as a pupil with the Long Eaton Gas Company. He was appointed Manager and Secretary of Alfreton Gas Company in 1920, and in 1939 he became a Director.

MR. RONALD W. DEANS, who has been assistant industrial adviser with the North Eastern Gas Board for the past four years, has been appointed industrial adviser with the Scottish Gas Board. He takes up his new duties in Glasgow early in the new year.

Diary

Nov. 25.—MIDLAND JUNIORS: Visit to works of John Thompson, Ltd., Wolverhampton.

Nov. 25.—NORTH THAMES G.C.C.: Westminster City Hall, Charing Cross Road, W.C.2. 2.30 p.m.

Dec. 1.—SOUTHERN G.C.C.: City Council Chambers, Portsmouth, 2.30 p.m.

Dec. 2.—SOUTH WESTERN G.C.C.: 34, Bridge Street, Taunton, 11 a.m.

Dec. 3.—LONDON JUNIORS: Annual Reception and Dance, Caxton Hall, St. James's Park, London, S.W.1. 6.45 p.m.

Dec. 4.—SCOTTISH JUNIORS (WESTERN DISTRICT): Joint Meeting with Eastern District, Heriot-Watt College, Edinburgh. 3 p.m.

Dec. 4.—WESTERN JUNIORS: Visit to Bath Gasworks: 'Human Relations in Industry—A Midsummer Night's Dream or As You Like It,' Dr. Duncan and K. E. Stringer.

Dec. 7.—SOUTH EASTERN G.C.C.: Caxton Hall, London, S.W.1. 11 a.m.

Dec. 7.—MIDLAND JUNIORS: 'Repairing a Bench of Vertical Retorts and the Extra Therm,' H. Kettlewell. Birmingham.

Dec. 10.—LONDON JUNIORS: 'Instrumentation in the Gas Industry, Review of Recent Developments,' T. A. Lucas. Edgware Road, London, W.2, 6.30 p.m.

Dec. 11.—YORKSHIRE JUNIORS: 'Mechanical Handling of Oxide in Tower Purifier Installations,' C. E. Mills. Sheffield.

Dec. 13.—MIDLAND JUNIORS: Joint Meeting with the Wolverhampton and District Engineering Society. Gas Offices, Darlington Street, Wolverhampton, 7.30 p.m.

Dec. 14.—EASTERN JUNIORS: Visit to works of K. & L. Steelfounders & Engineers, Ltd., Letchworth.

Dec. 14.—LONDON AND SOUTHERN SECTION, I.G.E.: 'Work Study and its Application to the Gas Industry,' J. B. Maylam, 17, Grosvenor Crescent, London, S.W.1, 2.40 p.m.

Dec. 15.—MANCHESTER JUNIORS: Visit to Radiation Production Centre, Warrington. 'Student Apprentice Training,' E. W. Stevenson.

Dec. 15.—WALES AND MON. JUNIORS (NORTH): Short Papers, Llangollen.

Dec. 17.—LONDON JUNIORS: Visit to Babcock & Wilcox, Ltd. Film show and demonstrations. Evening visit.

Dec. 18.—WALES AND MON. JUNIORS (SOUTH): Short Papers, Pontypool.

Obituary

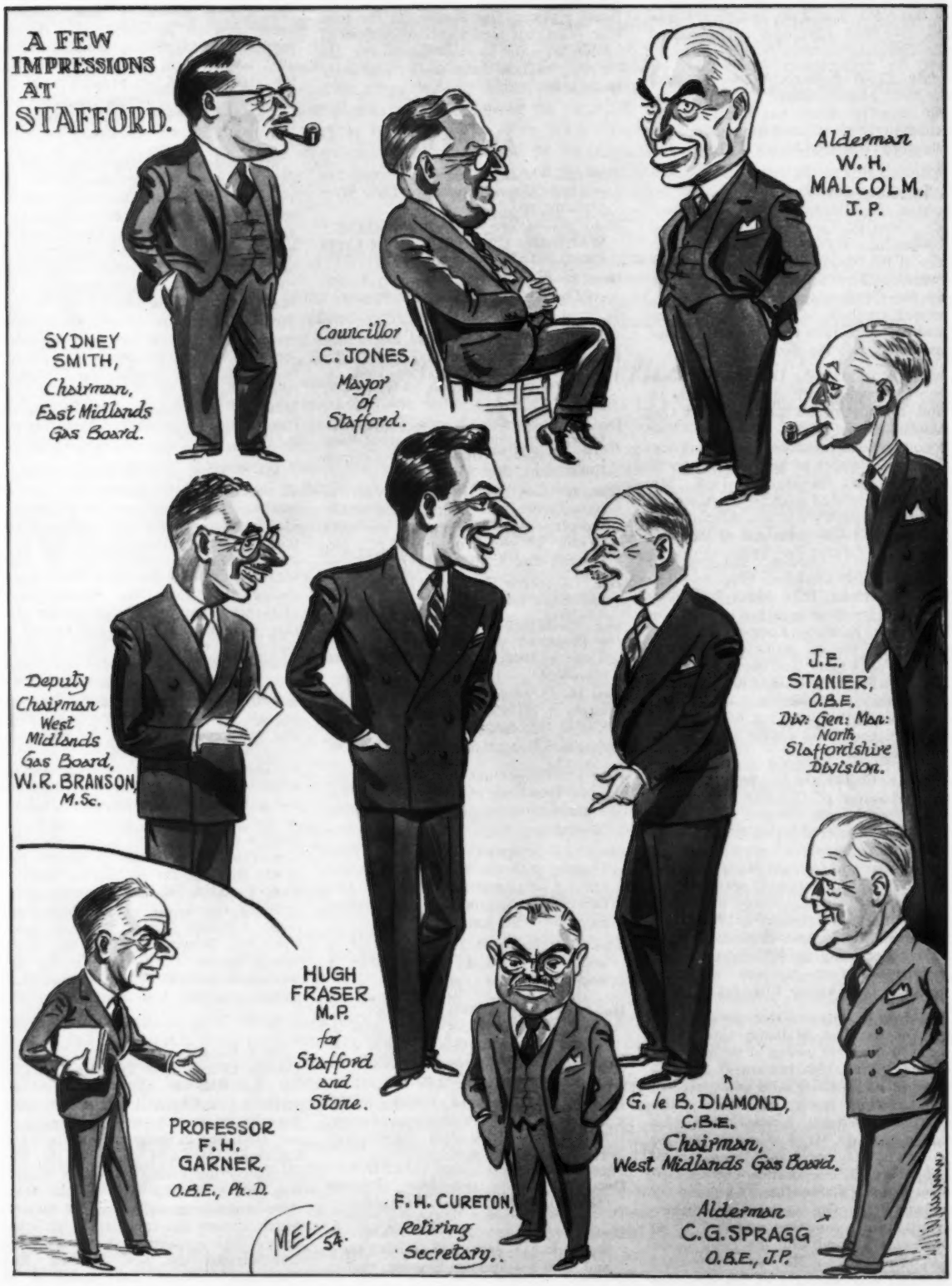
MR. A. J. THOMPSON, who was Midlands representative of Radiant Heating, Ltd., for a period of more than 25 years, died on November 11. He had partially retired owing to ill health in 1953 and then in January of this year he finally retired, on pension, from the Company. Mr. Thompson's death will be regretted by his many friends in the industry.

MR. WILLIAM CHURCHWARD RUSSELL, Centres Stores Superintendent of the Tottenham Division, Eastern Gas Board, has died. He had been with the old Tottenham and District Gas Company and its successor for 48 years and had he lived until his retirement would have completed half a century of service. He was an original member of the Board's Amateur Dramatic Society, but illness prevented his taking part in their recent 21st production. For many years he had been organist at Baptist and Congregational churches in North London, and latterly at Camden Road Baptist Church, where a memorial service was held.

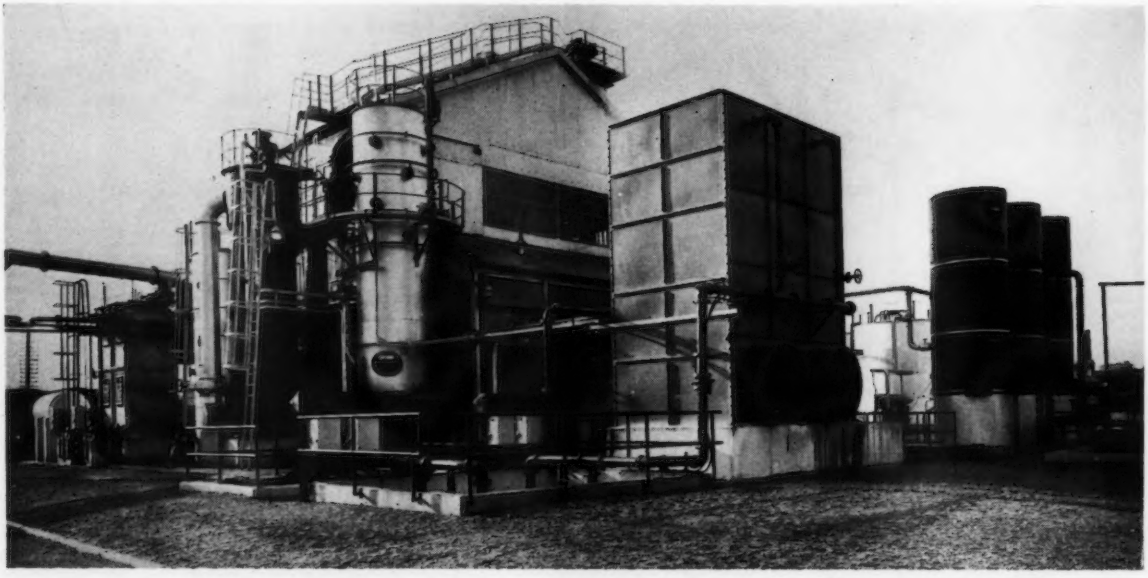
MR. P. E. BROWN, Showroom Manager of the Oxford and District Gas Undertaking, died suddenly on November 17. He had attended a Salesmen's Circle meeting the previous evening and took part in the discussions in his usual vigorous manner, but had a heart attack during the night. Mr. Brown started work with the Winchester Water and Gas Company in 1912 and moved to Oxford as manager of the old showroom in 1920. When the new showroom at Therm House was built in 1938 he had ample opportunity for developing his flair for displaying and selling, and has been responsible for many unusual and attractive designs. In 1949 he undertook the direction of all the showrooms in the Oxford Group and the publicity for the Northern Division of the Southern Gas Board, and he became a member of the Board's Publicity Committee. He took an active part in the work of the Advertising Club of Oxford and in all his activities, which included tennis and chess, had made many friends. During the first world war, Mr. Brown served in the Royal Army Service Corps and during the second he worked for local savings campaigns, charities, and recruiting.

Mr. Geoffrey E. Cox, Technical Liaison Officer, Gas Division, Thomas De La Rue & Co., Ltd., recently addressed the Ormskirk and Skelmersdale branches of the Women's Gas Federation on 'How British Standards Ensure Good Cooking.' Mr. Cox spoke of the part played by the British Standards Institution in protecting the public from inferior products, and described tests to which all new gas cookers are subjected before they are approved for sale. He demonstrated the new De La Rue 'Warwick' cooker and presented to each of the ladies present a copy of the De La Rue cookery book.

Gas Occasions—No. 3


A FEW IMPRESSIONS AT STAFFORD.
SYDNEY SMITH, Chairman, East Midlands Gas Board.
Councillor C. JONES, Mayor of Stafford.
Alderman W. H. MALCOLM, J.P.
Deputy Chairman West Midlands Gas Board, W. R. BRANSON, M.Sc.
J. E. STANIER, O.B.E., Div. Gen. Man: North Staffordshire Division.
HUGH FRASER M.P. for Stafford and Stone.
PROFESSOR F. H. GARNER, O.B.E., Ph.D.
F. H. CURETON, Retiring Secretary.
G. le B. DIAMOND, C.B.E. Chairman, West Midlands Gas Board.
Alderman C. G. SPRAGG O.B.E., J.P.
MEL 54.

Personalities at the inauguration on November 19 of the new Stafford oil gas plant



OIL GAS AT STAFFORD

A description is given of the catalytic oil gas plant, utilising the ONIA-GEGI process, which has been installed at the Stafford works of the West Midlands Gas Board, and which was inaugurated on November 19

SOON after vesting day in 1949 the West Midlands Gas Board appointed a small committee of engineers to examine and report upon the problems involved in the gasification of heavy residual oil. The motive that led to this action was the decline in the availability of good carbonising coal and the increasing price. There were also indications that gas oil would become increasingly expensive in consequence of the demand for the middle fractions of the oil refining industry for diesel traction and the like. Both of the prognostications have been fulfilled in the intervening years, and very heavy burdens of additional costs have fallen upon the Board for its basic raw materials, coal, gas oil and freight accounting for an increase of £4,267,000 of the total annual increases, amounting to £6,655,000, that have occurred beyond the control of the Board. The post-war programme of expansion of the refinery capacity of the petroleum industry in the British Isles seemed to provide one means whereby the gas industry could make good the shortfall of coal and, in suitable circumstances, perhaps produce gas at a lower price.

On the Continent, and in the Mediterranean countries particularly, economic pressure has driven the gas undertakings to use residual oil in place of the traditional gas oil for the enrichment of water gas. There is, however, a marked difference between the type of residual oil available on the Continent and in the United Kingdom. The greater part of the refinery capacity on the Continent is not provided with catalytic cracking facilities, in consequence of which the residual oil contains a larger proportion of paraffinic compounds, which are more suitable for thermal cracking in carburetted water gas plant, for it is probable that these compounds can be caused to react more readily with steam than cyclic compounds. In the United Kingdom, where the greater proportion of the refineries are equipped with catalytic cracking units, the basic residual fuel is cut back with materials to produce oils of given viscosity, which are not very suitable for either the thermal or the catalytic crack, as they are lacking in paraffinic bodies. The problem confronting the West Midlands Board was to make use of the residual products from the British refining industry, for little was known of their gas-making potential and nothing at all about the technique.

Experiments in Britain

The first experiments were initiated at Saltley gasworks in Birmingham in 1950, when a commencement was made in the use of heavy oil for the enrichment of carburetted water gas. The problem encountered here was to use the heavy fuel oil in a normal carburettor and to avoid if possible the accumulation of carbon residues within the carburetting vessel. These experiments, which have been conducted over a fairly long period of time, have been successful, but they do not form the subject of consideration to-day. They were, however, a stepping stone that lead to the catalytic gasification of oil. Much valuable research work had already been carried out by the South Eastern Board on this system of oil gasification at the time of the first catalytic development work in the West Midlands, and it was known that Gaz à l'Eau et Industriel (G.E.G.I.) were building an experimental catalytic oil gas plant at Cahors in France. After discussing the matter with Humphreys and Glasgow Limited, it was decided to approach the problem in an entirely different way from either the South Eastern or the French experiments, and a small carburetted water gas plant at Solihull was converted in 1951 for the catalytic gasification of residual oil on what is known as the regenerative principle. It was intended to use a catalyst devised by Humphreys and Glasgow Limited, and made in this country. While the plant at Solihull was being altered, a visit was paid to Cahors in France, and the result of the work there was so impressive that arrangements were made to use the ONIA catalyst, which was in use at Cahors, in the plant at Solihull. This proved to be a fortunate decision, for valuable experience has been acquired at Solihull over a long period of time on the behaviour of this catalyst, which has been severely punished and has survived the most exacting trials with astonishing resilience. After the visit to Cahors it was decided to order a one million cubic feet per day plant for erection in the West Midlands Area straight off

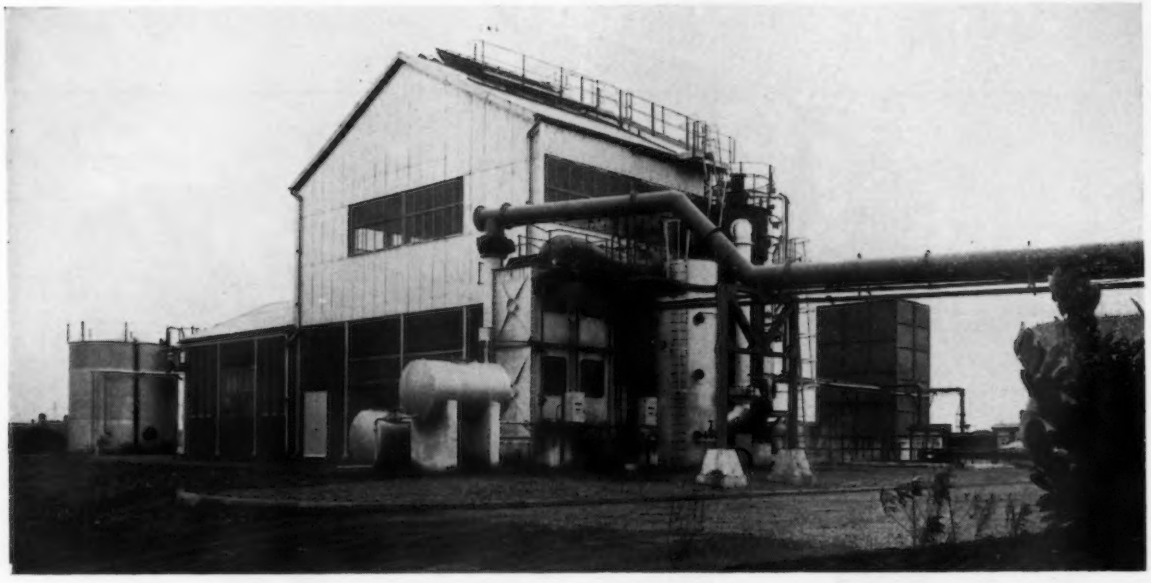


Fig. 1. A general view of the plant.

the drawing board and this plant is the one which was inaugurated on Friday, November 19.

Stafford Oil Gas Plant

When the plant was ordered in May, 1952, it was intended to erect it on a rather congested site at Cannock gasworks, for there then seemed to be no possibility of obtaining timely additional gas supplies for Cannock by means of integration with the new large production plant at Walsall. The situation, however, has since changed. Pipes are more freely available, and more progress has been made at Walsall than could have been contemplated at that time. It was, therefore, arranged that the catalytic oil gasification plant should be erected at Stafford, where it was more urgently required. The plant has a daily capacity of one million cu.ft. of gas of 450 B.Th.U. quality, and is of the same general type as the ONIA-GEGI plant at Cahors, which was described and illustrated in the paper by MM. Delsol, Billion and Pilloy in the *Journal des Usines à Gaz* in June, 1953. There is, however, one difference in that the plant at Stafford is provided with a pre-heater. The plant is of essentially simple construction, comprises a combustion chamber, having a steel shell lined with refractory bricks, and is fitted with an oil burner situated at the top of the vessel, which sprays oil in a downward direction. Air for combustion of this oil is admitted at the top of the vessel and is directed tangentially downwards. The next vessel is the pre-heater which, likewise, has a steel shell lined with refractory bricks, but it is partially filled with chequered bricks. Air is admitted at the base. The third vessel is the catalyst chamber, and is the largest of the three. It contains the catalyst, supported on a broken refractory base, carried by a brick arch. These three vessels form the essential gas-making part of the plant. Thereafter the vessels which follow are for gas washing, detarring and cooling, with a horizontal waste heat boiler of conventional design to capture the heat which would otherwise be lost.

The plant is brought up to working temperature by burning fuel oil in the combustion chamber and it can be started up from cold in from eight to twelve hours, but after a temporary shut-down gas-making can be commenced in from one to two hours from the ignition of the burner. The plant is worked on a cyclic basis. The operating cycle of 8¼ minutes comprises two phases of a blow and make period, which occupy between 47% and 50% of the cycle respectively, with a 3% steam purge period between. During the blow period oil is burned with primary air, and a mixture of air and combustion products flows from the combustion chamber through the pre-heater, downwards through the catalyst bed and thence through the waste heat boiler to the stack. During the make period steam is introduced into the pre-heater, oil is sprayed on to the top surface of the catalyst and the resultant gas passes away through the washer scrubber. As previously mentioned, the catalyst used at Stafford is the same as the one in use at Solihull since 1952. It was devised by Dr. Marcel Patry, Director of Research of ONIA at Toulouse, and is the subject of international patent applications. The essential element of the catalyst is nickel, which is well known to promote reactions between hydrocarbons and steam, but is equally readily poisoned by sulphur. Dr. Patry claims that by exhaustive research the difficulty of sulphur poisoning has been overcome by the introduction of appropriate elements into the composition of the catalyst which, it is stated, converts, fixes and removes the sulphur contained in the oil during the operational cycle. He says:—

"The use of nickel as a catalyst also leads to the phenomena of oxidation and reduction, the importance of which should not be under-estimated. Under the influence of the oxidising gases the nickel becomes oxidised with a considerable release of heat, in accordance with the following reaction:

$$(1)\ Ni + \tfrac{1}{2}O_2 = NiO + 58.5 \text{ cal.}$$

"This reaction occurs during the heating phase of the cycle. During some tens of seconds at the beginning of the production phase the reduction reactions in their turn take place. If the reducing gas were entirely made up of hydrogen one would have the reaction:

$$(2)\ NiO + H_2 = Ni + H_2O + 0.6 \text{ cal.}$$

which is almost isothermal and consumes a large amount of hydrogen. But the conversion of the oil produces reducing elements, carbon and CO among others, which can be oxidised by the oxide NiO. The two following reactions may then take place:

$$(3)\ NiO + CO = Ni + CO_2 - 9 \text{ cal.}$$

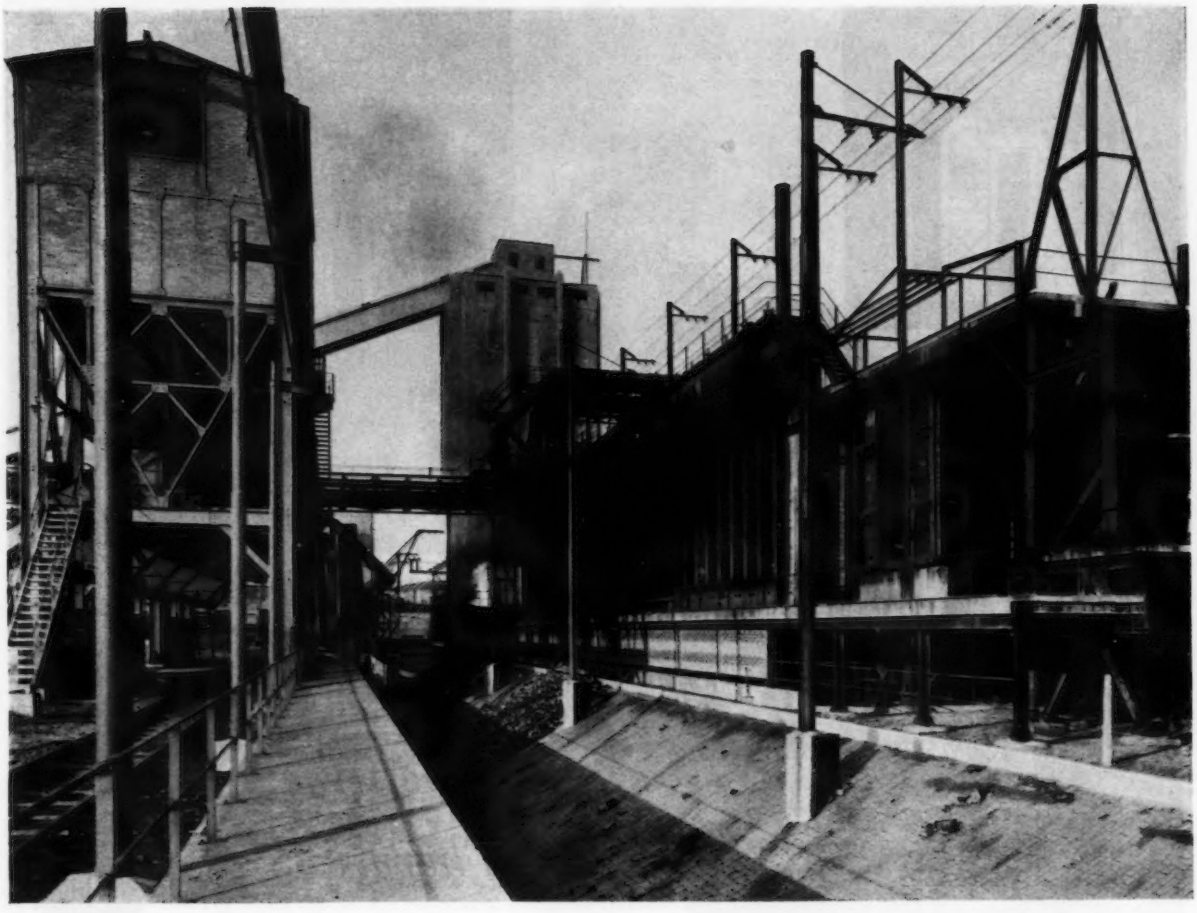
$$2NiO + C = 2Ni + CO_2 + 22.8 \text{ cal.}$$

"These last two reactions are productive of CO_2, while the reaction (5) produces water. The consequences in the manufacture of towns gas are important.

"If, in effect, it is desired to limit the concentration of CO_2 in the gas to a figure of 5% for example, the gas produced during the beginning of the make period must be eliminated, thus accepting a small reduction in output. The gas made in the first seconds of this phase contains 40% to 50% of CO_2. These disadvantages can be avoided by previous reduction of the catalyst, which is achieved, for example, by a recycling of the gas made. Industrially, however, the complication which results is out of proportion to the gain in output which one can hope for."

Ancillary Plant

The make gas passes through the washer-scrubber which is located outside the building and is carried on a steel supporting structure, the base of the vessel being of conical shape



The W-D Becker Combination Underjet Coke Ovens in operation at the Fishburn Carbonisation Plant of the Durham Division of the National Coal Board.

WOODALL-DUCKHAM

CONSTRUCTION COMPANY LTD.

Woodall-Duckham House, 63-77 Brompton Road, London, S.W.3.

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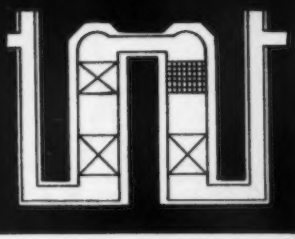
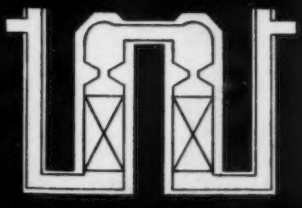
SEGAS CATALYTIC
OIL-GAS PROCESS



HIGH B.TH.U.
OIL-GAS PROCESS
(SEMET SOLVAY SYSTEM)



CARBURETTED
WATER GAS PLANT
(IGNITION DOME TYPE)

CARBURETTED
WATER GAS PLANT
(REVERSE-FLOW SYSTEM)

Competitive
Therms
from

HEAVY OIL

We also convert C.W.G. plant

for HIGH B.Th.U. oil-gas production

PGC

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STOCKTON-ON-TEES AND LONDON

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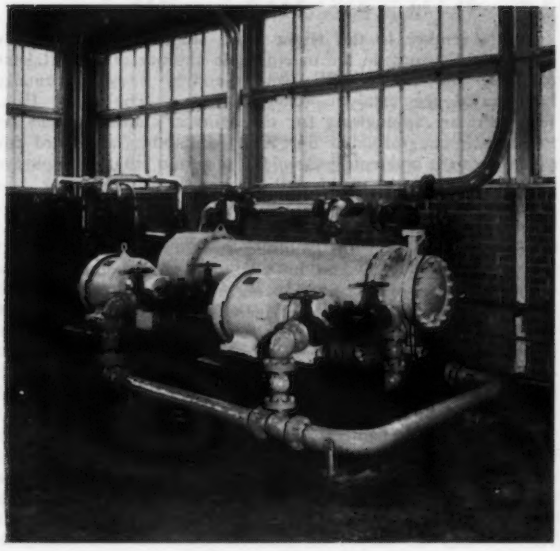

Fig. 2. Steam-heated oil heater.

and fitted with a rotary valve discharging into a flume. The washer-scrubber is followed by a standard Holmes Elex electrostatic detarrer which is lagged to prevent cooling of the gas during detarring. A secondary scrubber provides the final cooling of the gas and precedes a Holmes Multifilm naphthalene washer.

The effluent from the seal pots of the primary washer-scrubber, detarrer and secondary scrubber overflows into covered flumes which discharge into the tar separator, the effluent from the secondary scrubber first passing through a naphthalene separating bay. The tar settling in the separator is pumped to three vertical lagged tar steaming tanks for dehydration; the treated tar flows from these tanks by gravity into an underground tar storage tank. The hot water from the separator is pumped to the top of a Visco forced-draught tower in which the water is cooled and then pumped back to the water sprayers of the primary washer-scrubber and the secondary scrubber. The make-up water for this system is introduced through the final sprayers in the secondary scrubber in order to obtain maximum gas cooling effect.

Two 20,000 gal. heavy oil storage tanks are provided, and to assist pumping of the viscous oil, steam heaters have been located at the oil outlet from each tank. The heavy oil is pumped to the plant by one of two electric motor driven pumps the oil passing through a steam heater where its temperature is further raised. Two Weir steam driven boiler feed pumps are provided.

The building is of steel-framed construction with 4½ in. brick-work panels up to a height corresponding to the eaves level of the blower room, the walls above this level and the roof being of R.P.M. sheeting which has been painted with aluminium paint. Two motorised Hills ventilators have been incorporated in the roof of the building. The machinery room, which houses the two air blowers, oil pumps and secondary oil heater, boiler feed pumps, electrical distribution board and the detarrer rectifier unit, is of cavity wall construction and has a ceiling finished in Acousti-celotex tiles.

TABLE I

TYPICAL OPERATING RESULTS AT STAFFORD

	10 minute cycle with two layer catalyst			8.7 minute cycle with two layer catalyst			8.7 minute cycle with single layer catalyst only		
Average C.V. of run (d.Th.U. per cu. ft.)	430	447	475	440	457	490	460	480	496
Date	19.5.54	28.5.54	28.5.54	2.6.54	15.6.54	26.7.54	19.8.54	11.8.54	10.8.54
Specimen gas analysis (%)									
CO_2 ..	10.1	10.5	14.0	12.0	13.5	12.8	12.2	9.0	10.4
C_nH_m ..	1.7	3.0	5.4	4.2	3.5	3.9	3.6	3.4	3.4
O_2 ..	0.1	0.2	0.2	0.2	0.3	0.2	0.4	0.4	0.4
CO ..	24.2	22.0	15.7	20.1	16.8	16.7	15.5	17.6	19.4
H_2 ..	46.2	45.6	46.3	45.0	46.3	48.3	41.4	44.6	38.8
CH_4 ..	14.4	15.3	15.2	15.1	15.4	14.4	19.8	16.2	23.0
N_2 ..	3.0	3.4	3.2	3.4	4.3	3.7	7.1	8.8	4.6
Specific gravity ..	0.57	—	0.61	—	0.62	0.63	0.60	—	0.62
Cyclic heat oil (gal. per 1,000 cu. ft.)	0.78	0.67	1.30	0.72	0.87	1.00	1.13	1.19	1.15
Make oil (gal. per 1,000 cu. ft.) ..	3.3	3.72	4.49	3.59	3.51	4.66	4.26	4.35	4.54
Total oil (gal. per 1,000 cu. ft.) ..	4.08	4.39	5.79	4.31	4.38	5.66	5.39	5.54	5.69
Therms per gal. oil make	1.31	1.21	1.06	1.20	1.30	1.05	1.12	1.10	1.09
Therms per gal. total oil	1.06	1.03	0.82	0.99	1.04	0.86	0.90	0.87	0.87
Efficiencies (%) (oil at 18,300 B.Th.U. cu. ft.)									
Therms in gas Therms in make oil	74.0	68.4	60.0	67.8	73.5	59.3	63.3	62.1	61.5
Therms in gas Therms in total oil	60.0	56.4	46.3	55.9	58.8	48.6	50.9	49.2	49.2

The operation of the plant is cyclic and the valves are operated by a Humphreys-Glasgow mechanical type automatic operator located at ground floor level and adjacent to a comprehensive instrument panel. The plant operates on an 8¾ minute cycle which comprises two main phases, "heating" and "make," of approximately equal duration. During the heating phase, heavy oil is burned in the combustion chamber, and the hot products combined with further process air which

Fig. 3. Electric-motor-driven air blowers.

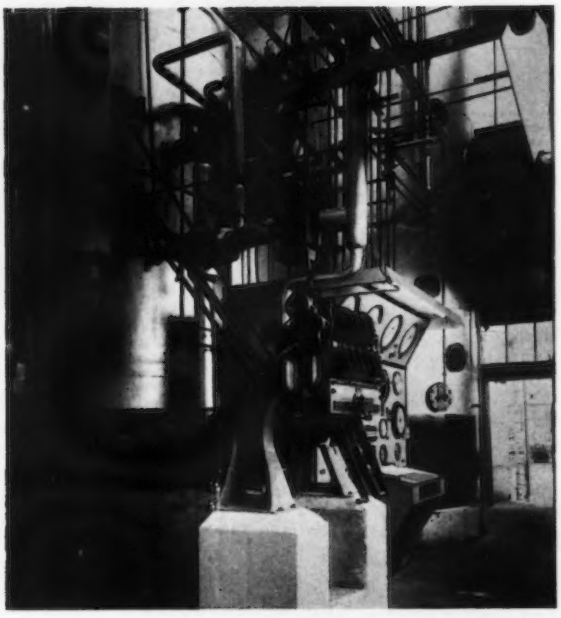

Fig. 4. A view showing automatic operator with vessels and instrument panel behind.

is admitted at the outlet of the combustion chamber pass through the catalyst bed raising its temperature and burning off carbon deposited during the previous make phase. The waste gases pass through the waste heat boiler and are discharged. In the make phase, heavy oil is injected into the catalyst chamber and together with steam passes through the catalyst bed, the resulting gases being cooled to 110/120°F. in the washer-scrubber prior to passing through the electrostatic detarrer and then the secondary scrubber where the gas is further cooled to 70/80°F. The naphthalene content of the gas is reduced to less than three grains per 100 cu.ft. before passing to the relief holder.

Some Results Achieved

As already explained, the type of residual oil available in this country is more difficult to gasify and liberates more carbon than the corresponding residual oils on the Continent, and much further experience will have to be gained before the full efficiency expected at Stafford can be obtained. The best figures to date are approximately 1.31 therms of gas per gal. of residual oil of 1,000 secs. viscosity Redwood (1) when producing gas of a calorific value of 450 B.Th.U. per cu.ft. (Table I). The oil for heating when making gas of this value is approximately one gal. per thousand cu.ft., and the whole of the steam required for gas making, oil heating and tar treatment is provided by the waste heat boiler.

The plant is entirely automatic, and the cycle operations are carried out by a standard Humphreys and Glasgow mechanical operator. The supervision is easily carried out by one attendant, but in the early days and during development work more technical supervision had, of course, been necessary for the smooth running of the plant.

Conclusions

The catalytic oil gasification plant at Stafford is the first of its kind in this country, and there can be little doubt, as a result of experience, that the oils available in this country can be gasified successfully, producing a gas which is entirely interchangeable with town gas, and at a figure which is lower than the normal cost of production of the usual type of carburetted water gas. It is believed in certain circumstances that catalytic oil gas could be produced as cheaply as coal gas in places where high transport charges are incurred in respect of coal. Unless fuel oil, however, can be obtained at a much cheaper price, this system of gasification cannot compete against the coke oven or against normal coal carbonisation technique in large modern works with reasonable freight charges.

The Inauguration Ceremony

On November 19 the Hight Hon. Hugh Fraser, M.P. for Stone and Stafford, in the unavoidable absence of the Minister of Fuel and Power (Rt. Hon. Geoffrey Lloyd), formally inaugurated the catalytic oil gas plant. The Right Hon. Hugh Fraser, apologising for the Minister's absence, and on his behalf, congratulated the West Midlands Gas Board for their foresight and enterprise. He said, too, that Humphreys and Glasgow, Ltd., could well be proud of their work. In fluent French he welcomed visitors from France, acknowledging that they alone knew the secret of the 'catalyst.' When the plant was in operation it meant a saving of 200 tons of coal a week and he was glad to announce that a further sixteen plants were being installed throughout the country with an eventual saving of half a million tons of coal a year. Talking of fuel economy, Mr. Fraser said the steps being taken by the West Midlands Gas Board were outstanding. He was glad to see healthy competition between the gas and electrical industries for he felt that it was right that both should seek to 'woo consumers.'

Mr. G. le B. Diamond, Chairman of the West Midlands Gas Board, thanked Mr. Fraser for his gracious references to the Board. Later Mr. Diamond, praising the Stafford Gas Committee of pre-nationalisation days for their foresight in planning extensions to meet growing production, called on His Worship the Mayor of Stafford (Councillor C. Jones) to unveil a plaque commemorating the inauguration of the new spirally-guided gasholder.

In 1949 there were four gasholders, having a total storage capacity of 1,550,000 cu.ft., which was insufficient for the growing demands for gas, and the Stafford Corporation placed an order with R. & J. Dempster, Ltd., of Manchester for a new gasholder. The design and construction of the foundation, including sub-strata investigation, was carried out as a direct contract by West's Piling and Construction Co., Ltd., Owing to the unknown nature of the sub-strata, four 6 in. boreholes were sunk, one at the centre and three around the periphery of the proposed gasholder site. These boreholes passed through soil for 5 to 6 ft., then a stratum of blue-brown clay and peat, about 11 ft. thick, followed by a stratum of peat down to 40 ft. depth, which overlaid a stratum of running sand 4 to 8 ft. thick, and finally gravel was reached at an average depth of 45 ft. It was, therefore, decided to adopt a scheme incorporating 431, 17½ in. diameter West's shell piles to take a maximum individual load of 50 tons.

Piling was carried out between August and November, 1949, and pile length varied between 47 ft. 6 in. and 70 ft., each pile being driven to a resistance to penetration, calculated from the Hiley formula, using a safety factor of 3 and utilising a 3-ton hammer, dropping 30 in. A reinforced concrete slab 155 ft. diameter and 10 in. thick, supported on the piles, was constructed at ground level on a 3 in. mat of lean concrete to protect the soffit. Construction of the holder at site was commenced in February, 1951, and completed ready for service in October, 1953.

The new gasholder is of the 4-lift spirally-guided type, in a steel tank, and has a capacity of 2 mill. cu.ft. of gas when fully inflated. The steel tank (which contains over 3½ mill. gallons of water, weighing about 16,415 tons) is 153 ft. in diameter and 32 ft. 4 in. deep and has 32 braced stiffeners fixed vertically on the inside of the tank. A Dunfermline manhole is provided in the tip row of tank side plates to enable a diver to gain access to the inside of the tank whilst the gasholder is still in operation.

A new British Standard which covers steel compression fittings for use with pipes made of steel and other suitable materials for a wide range of engineering purposes, is B.S. 2051:Part 3:1954. It applies to two ranges of fittings, namely, (i) for use with pipes having fractional outside diameters, ¼ in. to 1½ in. inclusive; (ii) for use with pipes designated by their nominal bores, ¼ in. to 1 in. inclusive.

This standard does not attempt the complete dimensional standardisation of these fittings since the variety in the designs and methods of production already established by the various manufacturers make any such attempt impracticable. It does, however, lay down such dimensions and requirements as are essential to ensure satisfactory installation and performance. Copies of this standard, price 3s. 6d., may be obtained from British Standards House, 2, Park Street, London, W.1.

The Norwegian Gasworks Association

The problems which face the Norwegian gas industry and means to overcome them were discussed at the recent meeting of this Association in Bergen, a meeting at which the President of the Institution of Gas Engineers was present.

THE 52nd annual meeting of the Norwegian Gasworks Association was held in Bergen under the Presidency of Mr. J. Sigurdsson, Tonsberg) on October 14 and 15, 1954, all gas undertakings being represented by members of municipalities, directors, engineers and others connected therewith. Visitors from kindred associations and from abroad included Mr. R. Jakobsen (President, Danish Gas Association), Mr. B. Dahlman (Swedish Gasworks Association), Mr. A. Hedberg (Sweden), Mr. W. Farr (National Coal Board) and Mr. W. K. Tate (President, The Institution of Gas Engineers).

A very full and interesting programme had been arranged although procedure differed somewhat from British practice, in that much time was devoted to commercial matters, these being of acute concern to an industry which must compete with electricity generated by hydro-power, with consequent low selling price to all categories of consumer. It follows, therefore, that the relative prices of imported coal and coke are of outstanding importance and, indeed, the aim of the Norwegian gas industry is to endeavour so to equate the charge for coal and the yield from by-products as to burden gas revenue with the charges for labour, maintenance and capital alone. The position is further complicated by the lack of any substantial base load for the industry such as cooking, and, with space heating forming the major demand, peak load problems are of a scale unparalleled in Great Britain, although industrial and commercial sales are increasing with the slow exercise of some steadying influence.

Official business on the first day opened with the President's Report, which referred in frank terms to the serious effect of British coal prices, which are high, and coke export prices, which are relatively low, thus upsetting the economics of gasworks, particularly since the purchase of coke from abroad is in the hands of a Government agency. It was indicated that American coal in large consignments is markedly cheaper than the British equivalent, but there were strong sentimental ties with the British coal industry, which had been the traditional source for over 100 years.

Foreign delegates were then welcomed and reports given of the proceedings at other Scandinavian Gas Association meetings, after which prolonged discussion took place on the desirability of storing, for emergency purposes, large quantities of coal and coke at gasworks. This subject was of purely local concern and embraced consideration of subsidies from the Government and stocking allowances, although constant reference was made to British coal and coke prices and their effect on the Norwegian gas industry, which was often stated to be on the point of strangulation.

A paper entitled "The Importance of the Gas and Coke Industry for our Country," was delivered by Mr. J. Irminger, lately General Manager of the Bergen undertaking, wherein stress was laid on the field for development, the necessity for propaganda—in which the Association is now engaging in so far as its funds will allow—and the desirability of modern appliances being made available in quantity. The discussion ranged widely and was enthusiastic, being followed by the consideration of a further domestic commercial matter related to the removal of a purchase tax on Norwegian home-produced coke.

During the morning the ladies were entertained by a visit to a very excellent government school for training in domestic management, and thereafter joined the members at luncheon as guests of the Bergen gas undertaking in their well-equipped demonstration room. In the evening the foreign visitors and their ladies were the guests of the Association's Committee at dinner in a hotel situated on the heights above Bergen, from which an entrancing view of the brilliantly lit city and the surrounding environs was obtained.

On the second day technical matters were to the fore, and the programme opened with the presentation of a paper by Mr. F. Meidell of Bergen covering installation work in consumers' premises, and the guidance that should be given to contractors. Furthermore, a Code of Practice compiled at Bergen was circulated for adoption by the industry and was accepted with one dissentient. The Code is akin to the more extensive British counterparts published by the British Standards Institution, and was prepared after consultation with the housing authority, fire brigade and other qualified bodies.

Reports on gasworks extensions were then made, and major projects seemed to be confined to Bergen, where a carburetted water gas plant of a nominal 1 mill. cu.ft. per day capacity had recently been put to work, a coal unloading crane installed, very fine lobbies, messroom and washing facilities constructed and preparations made for new compressors, the industrial demand for gas being an encouraging feature. The extensive modernisation of Oslo works is under consideration.

Formal business relating to the Association's accounts followed, officers for the next three years were appointed and the Presidents of kindred Associations were elected Honorary Members, after which the meeting concluded with the presentation by Mr. B. Paulson, General Manager of the Bergen undertaking, of a paper referring to the new C.W.G. plant at his works. This is the first of such plants in Norway and forms a part of the plan for the post-war modernisation of what is the largest gas manufacturing station in Norway. British gas engineers will be interested to learn that the peak winter demand is 3.5 times as high as the minimum summer output and hitherto fluctuations of this magnitude, which are not unusual there, have been met by continuous vertical retorts and by stop-ended horizontal retorts on some of the smaller works. The Norwegian engineer uses much English and German plant, but gas production is along normal lines, while attention is being given to the "Rochdale" process as a means of providing existing plant with an added flexibility under onerous conditions of demand.

After lunch a visit was paid to the Bergen gasworks, which is both modern and compact, being laid out to receive seaborne coal discharged by modern cranes of typical—and to English eyes unusual—Norwegian design. Carbonising is carried out in continuous vertical retorts of British manufacture, coke is screened on a plant of British design, and much of the ancillary equipment such as condensers, exhausters, etc., also comes from this country. Reference to the C.W.G. plant and new lobbies has already been made, and a further item of interest was the new compressing plant which will transfer gas at 15 lb. per sq. in. pressure.

On the same day the ladies were conducted on a tour of the beautiful fjords in the vicinity of Bergen and inspected the original factory for "Primula" cheese, while in the evening the Association held their annual dinner at the Hotel Bristol. At this most delightful function the President of the Institution of Gas Engineers was able to add to his earlier remarks at the business sessions, and to express the warm appreciation of all the foreign visitors for the hospitality, courtesy and friendliness extended to them by their Norwegian colleagues.

It is difficult to realise the burdens that the gas industry in Norway must bear with extreme competition from electricity and imported fuels, the tremendous load variations and the physical difficulties of climate and communications. The Norwegian gas engineer, too, must sometimes feel himself isolated in great measure from participation in the advance and progress of his colleagues in other countries, but no visitor from abroad can be other than impressed with the spirit of the industry, and the excellent fight it is making against the most heavy odds.

The London and Southern Junior Gas Association heard, on November 3, two short papers. L. O. V. Hayward, M.Inst.Fuel A.A.C.C.A., Coal Officer, North Thames Gas Board, presented

SEA TRANSPORT

IT is interesting to see to what extent our industry uses the sea as means of transport, and under the heading sea transport I also include river transport because the two are so closely connected.

During the year 1953-54, out of the 27.3 million tons of coal used in gasworks in Great Britain, approximately 34%, or roughly nine million tons, was brought on its initial stages of delivery by coastwise collier. As the total quantity of coal for all consumers shipped from the U.K. ports coastwise during 1953 was approximately 29 million tons, it will be seen that almost a third was shipped for use in gasworks. The boards utilising this method of delivery were: South Eastern (96%), North Thames (80%), Southern (65%), Eastern (30%), South Western (21%) and Scottish (3%). Approximate weighted average for these boards was 60%, or about 70% if we leave out Scotland.

As a general rule, the further one gets away from the collieries the more economical does seaborne coal become compared with other practical forms of delivery. This would most certainly apply in the case of works having facilities sufficient to deal with direct cargoes. It should be qualified to the extent that an inland works fed from a point discharging ships would bear double handling costs plus the transport cost from the port, and these might affect the economy of seaborne coal or otherwise. The size of the vessels used in seaborne transport must of course have a considerable effect on ultimate cost. The difference in the Chamber of Shipping rates for a 1,500 tonner and a 4,500 tonner, Tyne/London, is 5s. per ton in favour of the larger ship. It is therefore important that the largest ship available is used, commensurate with facilities at discharging and loading points.

You will, of course, know that certain boards own their own fleets of colliers, and in considering the type and size of vessels to be built all these special points must be taken into account. It does however become necessary on occasions to charter vessels either for one voyage or a period. A contract is then made between the shipowner and the charterer, and this is called a 'Charter Party.'

When chartering a boat, one is limited in the time it may be at one's disposal without penalty. Usually a number of running hours are shown such as 120/84. These apply to a 4,000 tonner. This means that if the time when the ship is ready to load and until she completes loading plus the time when she is ready to discharge until she clears, is below the lower figure, despatch money is paid by the shipowners. If it is over the higher figure, demurrage is paid by the charterers. There are certain excepted times such as week-ends and statutory holidays, and certain deductions which may be made for delays outside the charterer's control, but one golden rule always holds—once a ship is on demurrage, she is on demurrage all the time until she is cleared. This means no deductions for week-ends or holidays. The demurrage rate for a 4,000 tonner is £160 per day for the time it is in use by the charterers over the maximum hours allowed under the charter, so that you will see how important it is to get prompt turns for all ships. A ship trading between the north-east coast and the River Thames will make, according to circumstances, about 45 voyages a year. If four hours are lost on each voyage you have lost the equivalent of a cargo.

We will suppose that we have now settled on the weekly tonnage of coal which we must lift seaborne usually from Durham and Northumberland throughout the programme of six months. To whatever extent one's own fleet with normal running will fail to lift the quantities, ships must be chartered. As a general rule it is correct to say that each coal has its own particular staith where it is normally loaded. If it is sent to a staith further away from the colliery, extra loadage is incurred. Let us suppose that we have about 80,000 tons per week to lift, the coal coming from about 24 different collieries and loaded at 14 different staiths whether they be in the Tyne, the Wear, Hartlepool or Seaham Harbour. As the coal becomes available from the respective collieries, they require prompt ships to lift it. This is important from the National Coal Board's angle. A very careful liaison between London and the North is essential for this purpose. The probable discharging time or movement of ships in the Thames or other dicharging points is communicated to the North, and by this means, together with the aid of radio telephones when necessary, the positions of the ships stemmed are closely watched. The boat is offered to the colliery some days before it is due to load. There is very little margin for stocking outputs at the collieries, and from the receiver's angle, we require prompt turns and the coal in the Thames or South Coast rather than in the North. Therefore any delays to one or another ship may necessitate an alteration in stems. It is surprising how the weather varies over the 300 miles of a collier's voyage, and this in itself will cause bunching of ships at either end. Unless by quick decisions the bunching is broken up, the loss can be appreciable.

The vessel eventually is loaded and sails for the discharging point, both ship and cargo being fully covered for loss or damage by insurance. How now do we keep in touch? The sailing time is immediately wired South, and according to other vessels already in the Thames or on passage, a berth is arranged for her to take on arrival. The pilots are duly advised and all is ready for a normal trip South, we hope. Unfortunately for both the masters and crews things do not always work so smoothly. Fog and bad weather have a habit, especially in the winter, of interfering with the normal passage of ships. If the master knows that he is unable to make the normal time, he will get in touch by radio telephone. From the amended arrival time a change will be made if necessary in the discharging point, and instructions which may have been given to lightermen altered according to whether the coal is to be sent to stations by barge or whether the coal is required at a works able to deal with the cargo direct.

Having made arrangements regarding discharge, Tilbury Signalling Station inform receivers as soon as a boat passes, and we then know that in the case of ships going to Beckton they will in normal weather report within about and hour and a half, while the above-bridge ships for Fulham and/or Nine Elms will either go direct to their discharging points or anchor at Hanover Tier to await the next tide. During the discharge of the vessel the necessary Customs clearance papers for the vessel are lodged and in readiness for the voyage outwards the master will make his own arrangements with the pilot as to the time he will be leaving berth. Trimmers are again used in order that the full cargo may be unloaded. While, and even before discharge, those responsible for stemming in the North will be making arrangements for fixing the vessel for its next cargo.

This goes on continually throughout the year and we owe a deal of gratitude to the men who in all weathers bring for the various Boards concerned this vital nine million tons of coal per annum from the loading points on the North East Coast to our works.

In the case of my own Board we have some twenty-five or so ships running up and down the East Coast continuously. How necessary it is to keep the ships as evenly placed between loading and discharging points as possible, and to avoid undue delay at any time, will be obvious to you from these few notes.

'The Organisation and Utilisation of a Large Fleet of Mixed Vehicles' was also presented, by E. S. Caplin, A.M.I.Mech.E., Transport Manager, North Thames Gas Board.

ROAD TRANSPORT

THE question may well be put 'Why have a separate transport department at all?' There is a conception of the use of transport within the industry (and it may well be that of many people) that a fleet of motor vehicles should be maintained by a transport department and handled by other departments for their own particular needs in the movement of goods and materials. This, in my opinion, is a most wasteful method of using a valuable service. Separate control, as I hope this paper will to some extent demonstrate, ensures that the vehicles required can be moved from one spot to another as and when they are needed, and in the quantities needed. It allows for the most economical employment of labour and vehicles, and takes care of the seasonal fluctuations in many of the loads peculiar to the gas industry. By centralised repair and maintenance of vehicles, control over the mechanical condition of the whole fleet is provided at all times, and enables the stock of spares necessary to service this fleet over the whole operational area to be kept within economical proportions, while ensuring that there is no unreasonable delay in obtaining parts when required. The size and tread patterns of tyres used in the industry are extremely varied, and the rates of wear in the peculiar conditions are heavy. If vehicles are held and operated in small independent batches, the amount of tyre reconditioning undertaken is small, and the holdings of a very costly item are duplicated enormously.

Another considerable advantage from centralised administration of the transport fleet, is the possibility it gives of adusting availability of vehicle to balance seasonal variations and peaks in loads. Coke demands, for instance, are far heavier in the winter than in the summer, and it is only by interchanging vehicles over a large area that the lesser demand in the summer can be offset by alternative employment, so that idle vehicles can be kept to a reasonable minimum. Similarly, alternative uses for special types of vehicles, such as tar sprayers and bulk liquid transporters, can best be controlled and operated centrally. Processes such as these, if administered centrally, can often be carried to the point of providing alternative bodies, and articulated trailer vehicles for use at different seasons, but such a project would be extremely expensive if it were attempted to apply it on a haphazard basis locally.

The design of a fleet to meet the demands of varied traffics can be resolved only by the constant appreciation and analysis of the types and tonnage of goods to be carried, and then correlated with the purchasing and fleet replacement programmes. The selection of individual makes of vehicles will depend upon the knowledge and previous experience of reliability, service and vehicle types offered by individual vehicle makers. Also the results of the cost surveys produced from time to time by the transport cost accountant are a factor. The best method of securing efficient operation in a fleet of this size is by a small headquarters and decentralised local units. The headquarters unit is the central co-ordinating organisation for all transport units, indicating the repair shop organisation, and it is through this headquarters that contact is made with the controller of services to the board. Engagement of labour and problems of welfare are dealt with at headquarters by a labour officer, and from here there is the opportunity of reference to chief office, where the overall policy in respect of labour is effected. General policy, as laid down by the board, through the controller of services, as implemented through headquarters, and all recommendations for scrapping, fleet replacement, and purchasing policies, having been discussed and considered at headquarters, are referred to the controller of services of the board's approval. Located at the headquarters are the transport manager and his deputy, with the repair shop manager and the transport accountant. The sub-divisions within the department are on a functional basis, such as repair and maintenance, costing and accounting, hiring and charging, statistics and records.

The departmental accounting organisation works along the following general lines. It is a rule of the board that the cost of the transport organisation must be completely borne by the using department, and an accounting and charging procedure has been established fed by basic documentation from the five divisional transport offices. At the end of each financial year, the total charges to using departments must equal the total cost of the transport department, including all overheads. I appreciate that this is a case of the customer not being able to go elsewhere, but it so happens that, as established by the cost records, they obtain immediate, efficient and cheap transport—a case of a beneficient monopoly!

Another important function of the transport accountant is to maintain the whole costing system and to produce, for the use of the management, the detailed yearly costs of certain vehicle groups, and when required, cost surveys. A picture of the economy or high costs of particular vehicle groups is, therefore, constantly being produced. The cost of coke delivery is broken down to the overall cost per ton and sub-divided into delivery vehicle types, so that the most economical types of coke delivery vehicles can be established. Other groups of vehicles are brought down to cost per day, and the cost of all groups for control purposes is rigorously compared with the cost of transport hired for identical functions throughout the year. In addition, the average miles per vehicle per day or per ton, the number of days lost under repair, and the annual repair cost per vehicle are all produced for control purposes for all vehicle groups. The days lost per vehicle group, by reason of no work, often leads to fruitful examination, and the quest for alternative employment.

The other transport unit to be described is the repair organisation. The principle in the overall repair policy—as it is in deciding the strength of the board's fleet—is to undertake the basic load with direct labour, and to employ contractors to undertake the excess. All repairs are undertaken at the central repair shops. These shops comprise mechanical and body shops, and can undertake all mechanical and body repairs to any petrol or oil-engined vehicle. All work beyond the capacity of these shops (in amount not in scope) is sent to approved contractors.

With the shortage of vehicles and spares over the war and post-war years, and that diversity of vehicle makes that entered the fleet following the amalgamation of all vehicles from vested undertakings after nationalisation, the stocking and handling of spare parts presented a grave problem. Over the last five years, however, with the greater availability of commercial vehicles, we have been able in our replacement and purchasing programmes to confine the makes of vehicles to a minimum approved number of manufacturers. The reduction in the value of stores and in the diversity of spares that has been consequently achieved, has been most satisfactory, and will become increasingly so as the older and non-standard vehicles reach the end of their useful life. It will be seen, therefore, that the sub-division of the headquarters unit is on a functional basis, and that from here the centralised control is exercised. At this point, however, a degree of de-centralisation is introduced, the areas of operation being divided into geographical districts with local responsibility for the efficient operation of an allocated number of divisional group vehicles and the men who operate them.

(Mr. Caplin then described the N.T.G.B. fleet.)

Gas Manufacture in Paris*

By J. A. TOMES†

FROM April 27 to May 1, 1954, the author had the honour to be the leader of some 30 members of the Midland Junior Gas Association on their first venture overseas, namely, to Paris.

The British gas industry seems today to be more conscious than it ever was of the progress being made abroad in the development of new techniques and the object of this visit was for members to see for themselves what foreign gasworks were really like, and it was an obvious choice that they should choose the capital of the nearest Continental country to ourselves. All members of the party visited the Gennevilliers gasworks and the factory of La Societe Rateau, but one day split into two parties, the works members visiting the new gasworks at Alfortville whilst those interested in the industrial side inspected the plant at the Societe Material Electrique de Controle Industriel, and also the Compagnie Industriele et Commerciale de Tubes.

La Societe Rateau

This visit was made by all members since it was considered that the modern layout was very well worth inspection. The factory is situated at La Courneuve, approximately five miles to the north-east of Paris, and occupies a ground area of 50 acres, employing 2,200 workers (54 hour week), plus a technical and administrative staff of a further 800 employees.

Among the many products manufactured at these works are steam turbines, diesel engines, centrifugal exhausters and boosters, axial flow compressors, vertical reciprocating compressors, electricity generators, valves and pumps, etc. One of the most interesting departments was the foundry using the 'lost wax' method of moulding, where the party saw turbine and centrifugal compressor impeller blades being cast. This method is used almost exclusively for moulding blades made of alloys which are not machinable. A wax casting is made from dies, this is then used as the pattern for the sand mould, the wax is then melted from the mould, and the molten metal poured in the mould, the resulting casting being equal to a fully machined product.

Also seen were a number of radial wheel boosters and compressors in the course of construction; these are applicable for gas volumes of 300,000 to 1,500,000 cu.ft. per hour, a single stage machine giving 3 lb. per sq. in. pressure rise, with 6 lb. pressure difference for a two-stage machine. In view of the speeds at which these boosters are running the impellers are cut from a solid piece of metal; this involves precision machining, in order to ensure perfect balance at speeds up to 8,500 r.p.m. Laboratory tests are carried out on samples of all metals used for high speed units. It was also interesting to note that almost all the bedplates for various types of plant are of fabricated steel and welded, instead of the heavier and conventional cast iron baseplates.

Alfortville Gasworks

It was the original intention of the party to pay a visit to the Cornillon gasworks, but due to a strike it was necessary for this visit to be transferred to Alfortville. Alfortville is situated on the banks of the Seine in the south of Paris, being a completely new works in the course of construction—this commenced in October, 1951, and should be completed this month (November, 1954). This will eventually replace the old Paris works, the current programme envisaging the construction of coke ovens capable of gasifying 1,500 to 1,650 tons per day, giving an annual gas production of 200 million m³ (*i.e.*, 7,000 million cu.ft.). It is estimated that the cost of production of gas into holder will be 10 francs per m³ (about 13d. per therm), including capital charges. The calorific value of the gas distributed in Paris is 4,200 calories/m³ (440 B.Th.U. per cu.ft.).

The retort bench comprises five batteries of 15 Koppers retorts generally conforming to the usual pattern which will take a charge of 15 tons of coal giving a mean day capacity of 20-22 tons in accordance with the speed of gasification. They have compound heating of the underjet type, *i.e.*, they can be heated with producer gas or oven gas. The coke quenching is carried out dry by the use of the Sultzer process, the production of steam being 0.35 Kg. per Kg. of coke quenched (0.35 lb. per lb.) (steam at 15 Kg. superheated to 300°C.).

At the present time this station is equipped with four gas producers operating on coke, making producer gas of 1,200 calories (126 B.Th.U.) for heating retorts. The normal output from each apparatus is 60 tons per day and the maximum 80 tons per day. Two further producers are also envisaged, one for the adjustment of the calorific value of the gas and the other as a standby.

The following ancillary plant is also installed at Alfortville:—

Two primary condensers normally working in series, and ranged in two parallel lines the following apparatus: two electro-static detarrers, two secondary condensers, four ammonia washers (two washers in series), and after purification (by means of towers), four benzole strippers, two strippers in series.

It is interesting to note that electro-detarrers, secondary condensers and ammonia washers are situated on top of a large pump room. Likewise gas meters are situated on the roof of a building with the control apparatus, valves, etc., placed beneath.

Coal Handling

Coal from Lorraine and the North of France arrives either by rail or water and the sidings are so constructed as to allow for the simultaneous reception of two complete trains and for their loading on to the coal stacks without breaking up the train.

Similarly coal barges can come alongside the whole length of the coal dump so that they are enabled to unload at the place in the dump corresponding to the quality of the coal that they are carrying. Handling is carried out by two overhead cranes each of 150 tons per hour capacity which deal with both barges and trucks.

The conveyors are of 150 tons per hour capacity and feed the crushing, stocking and grinding installations. The coal is first treated in two crusher-separators which serve to eliminate foreign bodies and bring the coal down to 50 mm. maximum. It is then reduced to 10 mm. maximum by two hammer crushers. The coal thus pulverised is carried to hoppers having a capacity of 6,000 tons and the mixture of the various qualities of coal after further crushing to 8 mm. is brought about by variable speed distributors. Pulverised coke (0.2 mm.) is added, together with up to 5% to 10% of fuel oil before carbonisation.

Compression

Gas is sent via a 300 mm. main (12 in.) some 300 Km. (190 miles) from Lorraine to Paris, with an initial pressure of 60 Kg. per sq. cm. (850 lb. per sq. in.) and arriving at 10 Kg. per sq. cm. (142 lb. per sq. in.). This gas will be brought to Alfortville, where it will be mixed to give a gaseous mixture of the correct calorific value and then re-distributed through the feeder mains to the Parisian area.

The Alfortville coke ovens will be supplying the Parisian region and therefore compression has to be installed to meet very heavy outputs.

The compressor plant will comprise the following:—

(1) Equipment for receiving the gas from the east with arrangements for regulating the calorific value and direct distribution into the high pressure feeders.

* Abstracted from a paper given before the Midland Junior Gas Association in Birmingham on November 9.

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(2) One compressor installation for Paris and the near suburbs comprising three compressors each having a capacity of 25,000 m³/hour against 0.25 Kg. (900,000 cu.ft. per hour at 3½ lb. per sq. in.) pressure for the normal load period and two compressors of 100,000 m³/hour against 1 Kg. pressure (3½ million cu.ft. per hour against 14 lb. per sq. in.) for the peak loads, these latter compressors cover the range of 25,000—100,000 m³ with a satisfactory output.

(3) An installation of three compressors having an output of 6,000 m³/hour against 4 Kg. pressure (210,000 cu.ft. per hour at 57 lb. sq. in.) and capable of being converted for 10 Kg. (142 lb. per sq. in.) pressure by the addition of a second stage. These compressors are installed to cope with any failure in the feeder supply from the east.

Gennevilliers Gasworks

The gasworks at Gennevilliers supplies 133 parishes in the suburbs of Paris (2½ million inhabitants), being situated on the banks of the Seine some 8 Km. to the north and occupying an area of 100 hectares (247 acres).

The gas produced is a mixture of coal gas, C.W.G., producer gas and propane, and the productive capacity amounts to about 2 million m³ per day (70 million cu.ft.), corresponding to a normal output of 1¼ million m³.

Gas Production Plant

Coke ovens—four batteries comprising a total of 72 Becker type coke ovens of 13½ tons (giving a consumption of 1,400 tons of coal per day) with a production of 500,000 m³ of gas of 5,200 calories (17½ million cu.ft. at 550 B.Th.U.).

Continuous Vertical Retorts.—Two batteries, a total of 56 Woodall-Duckham vertical retorts of 9 tons each, carbonising 480 tons of coal a day.

Inclined Retorts—two batteries of 54 retorts each capable of gasifying 300 tons of coal a day.

The cost of production of gas is estimated at 1½ units for continuous verticals against unity for coke ovens, so that ovens are employed for base load and verticals used intermittently.

Producer Gas.—Producer gas for heating the retorts is produced in a gas producer station with automatic charging and ashing and has five gas producers of 50 tons per day and five of 75 tons per day. On an average 80% of the producer gas is used for heating the retorts, the balance being used for adjustment of calorific value.

C.W.G.—This plant is probably the finest in Europe. In the older house there are six Humphreys and Glasgow sets which each produce 60,000 m³ (2.1 mill. cu.ft.) of water gas, and two of these have been converted to form one unit operating on the Hall Process. In the English technical press a while ago a summary appeared of the excellent paper by M. Coussy, Chief Engineer at Gennevilliers, on this subject, given to the French Gas Association last summer. A new house put into service at the end of 1951 contains four Humphreys and Glasgow sets of which further details are given later.

Propane.—There is a station for the gasification of propane which comes into the works by rail being discharged into tanks by pumps; the cost is £24 per metric tonne—1s. 0d. per therm (1,000 therms for £48). The plant is capable of gasifying 75 tons of liquid propane per day and this represents a production of approximately 38,000 m³ of propane gas with a C.V. of 24,000 calories per m³. This permits the enrichment of 250,000 m³ of producer gas to 4,200 calories.

Mixture Regulation of C.V.

The mixture of the different gases is adjusted to the statutory level by means of producer gas, and a Cutler Hammer regulation plant is in course of erection to accomplish this automatically.

Coke Grading

Coke grading is carried out by B.A.M.A.G. screens which produce six grades of coke as follows:—(1) 0-10 mm. (0.4 in.); (2) 10-20 mm. (0.8 in.); (3) 20-40 mm. (1.6 in.); (4) 40-60 mm. (2.4 in.); (5) 60-80 mm. (2.8 in.); (6) Over 80 mm. Each grade can be delivered in bulk or bagged at the rate of 400 bags per hour.

Ancillary Plant

Purification plant is of the standard type with primary and secondary condensers; washing is carried out for naphthalene. There is also a benzole stripping plant, a sulphate of ammonia plant and a tar treatment plant.

There are six gasholders at Gennevilliers, two having a capacity of 60,000 m³, two a capacity of 100,000 m³, and two a capacity of 225,000 m³, and over and above this, two gasholders of 60,000 and 100,000 m³ capacity are installed at the sub-station at Alfortville.

For transportation within the works there is a network of railways with ten locomotives and two battery locomotives.

There exists too a central boiler house comprising 10 boilers of 300 m² (3,228 sq. ft.) of heating surface to supply steam for the works use and to feed the turbo-generators which produce the electrical energy. The total installed output of the generators is 4,000 K.v.a. at 500 volts D.C. There is a balancing station which transforms the 15,000 volt A.C. of the E.D.F. distribution system into 500 volt D.C. for works use. These transformers feed from the grid supply alternating current for lighting and for certain motors.

It is felt that the reader will be interested, as the visitors were, in the propane installation and the new C.W.G. installation and therefore further details are given of these.

New Gennevilliers C.W.G. Plant

General Description.

The new C.W.G. installation comprises four sections of Humphreys and Glasgow plant provided by their French Associates, Gaz a l'Eau et Gaz Industriel. Each section of plant has a daily capacity of 4,750,000 cu.ft. of 450 B.Th.U. gas or 4,150,000 cu.ft. of B.W.G. and is designed for, and has operated with gas oil, wax distillates and heavy oil for enrichment. The plant is the largest post-war installation of water gas on the Continent and has now been in operation for about three years.

The whole installation is most impressive and compares very favourably with modern installations in this country. A first-class layout has been possible as a result of the ample ground space available, the ancillary plant particularly being given generous room for future additions. The installation is laid out for future extension to twice its present capacity, and in view of these future extensions one end of the building has been temporarily bricked.

The plants use oven coke and have wet sealed generators with annular boilers operating at 50 lb./sq. in.; they have empty carburetters, chequered superheaters, vertical taper waste heat boilers operating at 175 lb./sq. in., cone based washers and vertical tube spiral type condensers. The units are controlled by water hydraulic automatic operators.

The two most interesting features of the installation, from a visitor's point of view, are the cycle clocks and the flow panels situated on the operating floor. Four large illuminated cycle clocks have been placed on the wall at one end of the building and these instruments provide a clear indication of the way in which the cycles of the four plants are co-ordinated. The animated panels showing the arrangements of the various flow systems and the sequence of operation of the automatically operated valves for each plant were of considerable interest.

Building.

The building housing the plant is most imposing, being constructed of reinforced concrete with brickwork panels. It was noticeable that the designers had taken every opportunity to use reinforced concrete construction in preference to structural steelworks, such things as conveyor bridges, washer supports, operating floor supports, some access platforms and even the breeze pouches being made of this construction.

Coke Handling.

The coke requirements of an installation of this size are, of course, considerable, and the coke is elevated to the overhead storage bunkers by means of conveyors instead of skip hoists as is usual in this country. This arrangement seems to have advantages over coke handling practice in this country for water gas plants, particularly where allowance has to be made for a substantial extension of the installation. The oven coke is delivered to the plant in bottom opening railway wagons. The coke is emptied into a concrete bunker below the railway lines; a feeder plate at the bunker outlet and a series of conveyors raise the coke to the top of the C.W.G. plant building. At this point a shuttle conveyor distributes the coke automatically into the four storage bunkers.

Each bunker has two trigger mechanisms, the first of which

when tripped starts the feeder at the outlet of the bunker below the railway lines and coke is therefore fed on to the conveyor system and discharged into the overhead bunker. The shuttle conveyor slowly and automatically traverses along the top of the bunker until the second trigger is operated and the feeder plate at the lower bunker stops, the coke still on the conveyors being emptied into the storage bunker as the conveyors continue running and are not controlled by the triggers. The shuttle conveyor then moves on to the next bunker where the above cycle is repeated. With this arrangement there is no spillage of coke during the moving of the shuttle conveyor from one bunker to the next. The shuttle conveyor slowly traverses along the top of the four bunkers and then returns to its starting position and stops automatically. The whole operation is carried out by one man responsible for opening the doors of the wagons.

Self-Clinkering Generator.

One of the many departures from conventional design incorporated in the Gennevilliers plant concerns the arrangement of the self-clinkering generators. The generators themselves are of straightforward wet sealed design but they have been raised several feet above ground on concrete piers. Two advantages result from this arrangement; the pit below the generator has been eliminated and the ash and clinker which is discharged over the side of the ash pan falls into storage pouches which feed direct into railway wagons running on tracks into the building, thus eliminating all ash handling and elevating plant usually incorporated on large installations.

On the other hand, by raising the generators it is also necessary to raise the carburetters, superheaters, waste heat boilers and washers, and the extra cost of the resulting higher building and bunker structure must be quite considerable.

Carburetter

The carburetter is chequerless and incorporates a refractory throat in its lower part. The gas connection from the generator is tangential and gas and oil flow down through the carburetter. Just above the throat are air inlets for the admission of 'carbon burning' air to remove deposits during heavy oil working. The superheater is chequered.

Waste-heat Boiler

Humphreys and Glasgow vertical waste-heat boilers operating at 175 lb. per sq. in. are provided. A new feature here is that under the base of each boiler is a wet type of grit catcher, the waste gas being directed on to a water surface which traps the fliers. The wet fliers are discharged through an outlet valve in the conical bottom of the grit catcher. The stack valves are outside the building just above roof level, each being surmounted by a smoke stack to throw the gases well clear of the bunker structure. Connections have been provided so that when the plants are manufacturing blue gas the uprun blue gas can be passed through the waste heat boiler in order to increase steam production.

Wash Box

As is usual on modern plants, the wash boxes have conical bases, the sludge being discharged into flumes through two interlocked valves. The washers are supported on reinforced concrete legs.

Condenser

There are four condensers of Humphreys and Glasgow spiral design and the gas connections have been arranged so that the direction of gas flow through each condenser can be periodically reversed in order that naphthalene deposits on the tubes in the last passes can be removed by the condensing tar.

Ventilation and Cleanliness

The whole installation has been designed with emphasis on cleanliness and adequate ventilation, virtues which until recently have not been given sufficient attention in this country. The following features were noticed on the Gennevilliers plant and seem worthy of incorporation as standard on large plants in this country:—

1. Stack valves outside the building.
2. Fliers collected by a wet process.
3. Wash boxes with conical bases.
4. Bottom 10 ft. of the building left open.
5. Minimum handling of ash and breeze.

Propane Plant

The propane plant which was put into operation in November, 1951, comprises the following:—

Twelve reservoirs of 100 m³ (3,500 cu.ft.) each representing an effective storage capacity of 480 tons of liquid propane.
One vaporiser capable of gasifying liquid propane with a variable output of 1 to 4 tons per hour.
Two Brunner compressors each having an output of 20 m³/hour (700 cu.ft.).
A Guinard piston pump having an output of 8 m³/hour (280 cu.ft.).
An installation for the regulation of output.
A pump house with a fire protection network.
An open garage for three large road tankers each capable of carrying 9 tons.
The motors and equipment both for power and lighting.
A sampling station for propane.

The liquid propane is received, either in large tankers or wagons; a main feed is installed to transfer it to the storage reservoirs either by means of the Brunner compressor or by the Guinard pump. The visual control of the flow of the liquid to the reservoirs is by means of a 'Rotameter.' The reservoirs are fitted with dial gauges.

The liquid propane flows by gravity from the reservoirs to the vaporiser; the heat necessary for the vaporisation is supplied by means of a steam coil carrying steam at 1.5 hpz (1.5 atmospheres or 22 lb. per sq. in.) effective pressure.

The control, in the gaseous phase at the outlet of the vaporiser, is by a pneumatically operated valve operated by M.E.C.I. regulator. So as to prevent the flow of liquid propane into the gas collector, due for example to insufficient steam being available the vaporiser is fitted with a level indicator which operates an audible alarm. The supervision of the station is in the hands of an operator whose office, which is entirely of glass, and situated above the pumps and compressors, dominates the complete plant.

Distribution

The total length of mains involved in the distribution of gas amounts to more than 4,700 Km. (2,700 miles) of which 360 Km. (200 miles) approximately constitutes the main distribution network. The number of consumers is 640,000.

Two compressor houses at the Gennevilliers works permit the compression of the gas. The more recent one, which was put into operation at the end of 1950, comprises four centrifugal compressors of 50,000 m³/hour (1¾ mill. cu.ft.) capacity, and suppliers by eight principal feeders the network of Paris suburbs, which interconnect with the main Paris network. This station has telecontrol of all equipment (compressors, ancillary equipment, valves) from a central location, with all the necessary safety precautions and devices. The compressors are Rateau single-stage, motor driven and capable of an hourly output of 50,000 m³ at 1,500 mm. (1¾ mill. cu.ft. at 60 in.) water gauge pressure with totally enclosed ventilated motors of 375 h.p. D.C.

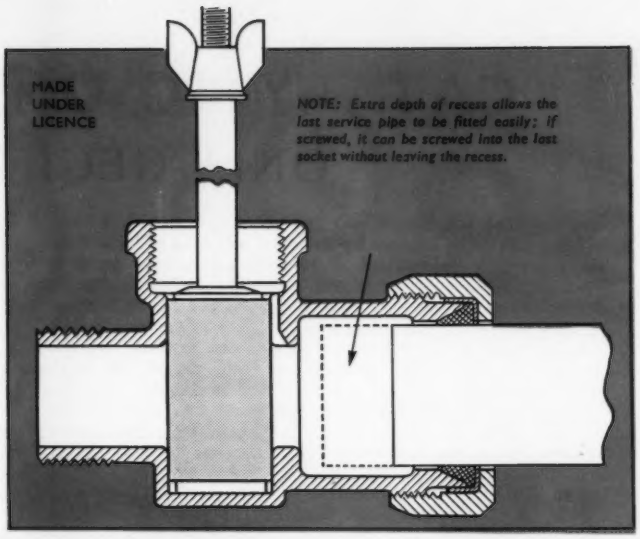
There is a synoptic picture representing the suction and compression circuits of the machines, the supplies to the electric motors, the valves and contactors with luminous indicators showing the precise open and shut positions. The recorders for the pressure and volume on the eight feeders are operated by a double venturi device placed in the feeders.

In auxiliary houses there are (a) four conditioning plants for the ventilation of the motors and compressors, (b) two groups of motor compressors for the production of compressed air for the operation and isolating valves, etc., and (c) the electrical control equipment which is fed by 48 volt supply from a battery of accumulators.

Conclusions

My personal outstanding impressions at the end of our stay, were:—

(1) French engineers appear to be ingenious, virile, and practical.
(2) The excellent appearance of the works buildings, although I would be interested to hear other members' views as to whether the inevitable high capital cost in their opinion is justified.
(3) The faith which our counterparts in the French gas industry place on remote control, many of their motors being operated from a remote central control station.
(4 The excellent layout of the works and the factories visited. One had an impression of orderliness and efficiency.
(5) The development of the French gas industry by integration has made great progress.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An alternative form, for top outlet, is shown on the right.

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The second item on the right is the Viking service adapter, suitable for connecting to any internal thread.

Below it is shown a standard Viking 'Junior' coupling for use on screwed or plain-ended pipes.

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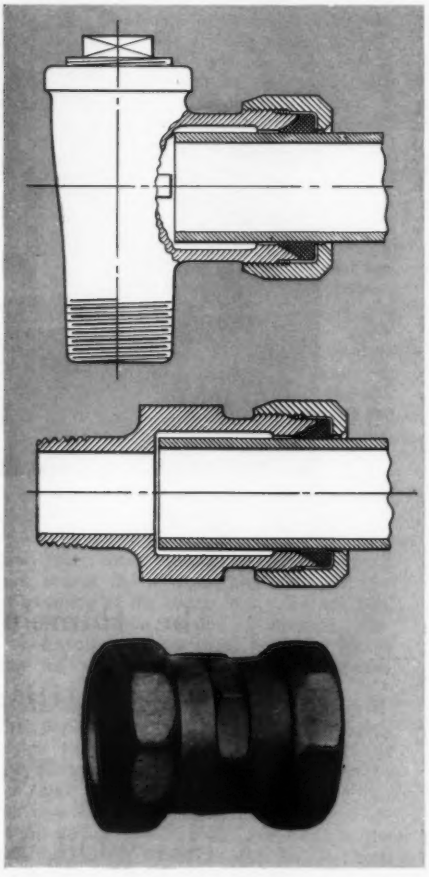
Viking Johnson flange adapters are useful for connecting plain pipes to valves or orifice plates, and have been recommended under safety regulations for blanking off gas mains.



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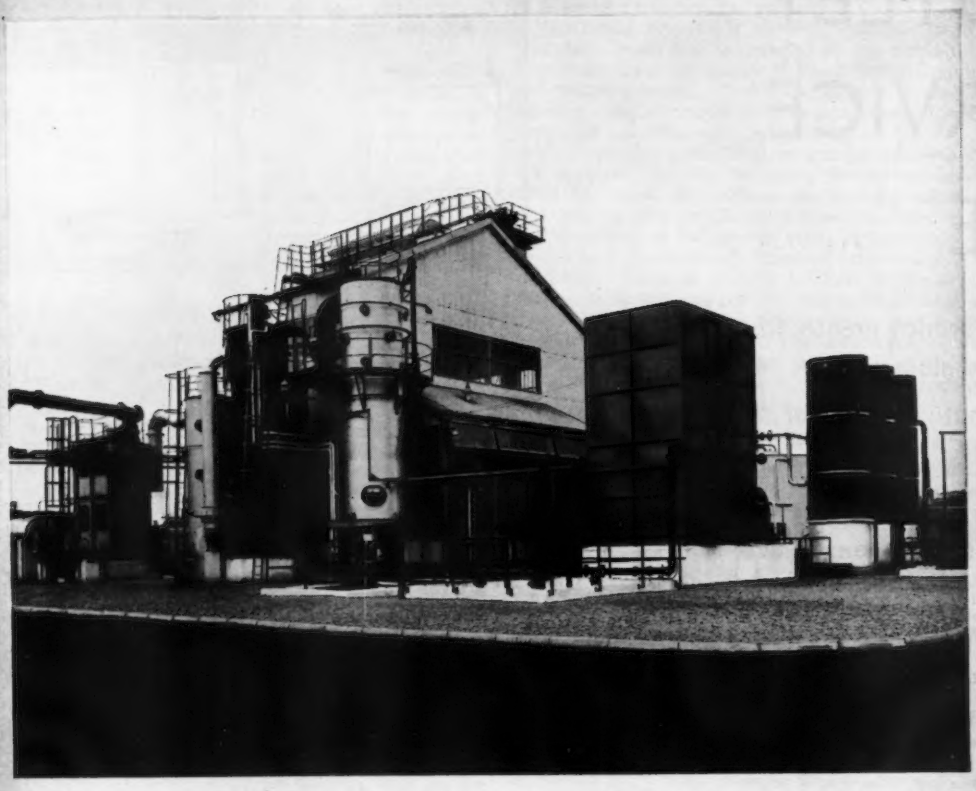

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TINGLEY LIQUID EFFLUENT TREATMENT PLANT

The discussion on P. C. Egan's recent paper to the Manchester and District Section of the Institution of Gas Engineers, an abstract of which appeared in last week's JOURNAL.

Mr. **H. Johnston,** O.B.E., Chairman, commented that perhaps the major trouble had arisen in the polyhydric dephenolation, where, it was surmised, exposure and oxidation caused a change in composition and physical characteristics. The resultant solids, referred to as gum, caused blockages, unsaleable salt, and eventually total stoppage. The elimination of the butyl acetate wash, with the substitution of batch oxidation and filtration, had enabled the plant to work practically continuously, producing salt for which a regular market had been secured. Mr. Egan had described a second stage, which involved recrystallisation of fully oxidised first stage salt, after the removal of the precipitate. This had been experimentally proved successful, but it was thought that the cost of removing the discoloration would not be greatly exceeded by the enhanced price received for a pure salt.

The plant was now working without butyl acetate washing for secondary dephenolation and without the final carbon filters in circuit. The final effluent was of the order of 150 O/A, virtually free from ammonia, chloride, and sulphur compounds, and was being used in the coke quenching circuit. No effluent was being discharged to sewers or drains. Initially, with carbon filters in circuit, an effluent of 5 O/A was achieved for a short spell, but the position might have been difficult if the carbonising plant had been continuous verticals without a quenching system to take effluent.

He had held the view that the process could be successful, operationally, but from the results he was doubtful whether the process, as it stood, could be economically attractive, at any rate under Tingley conditions. Mr. Egan included a cost statement, based on a 25-day test run. The net cost was high, higher than it should be, by reason of the sub-strength of the crude liquor passing to the plant throughout the period. Steam was another major expense in the cost account.

Mr. **J. J. Priestley** (W. C. Holmes and Co., Ltd.) said that the only really serious difficulty of operation was caused by gum formation. Gum formation on the scale experienced at Tingley was something new. What appeared to be an insignificant amount in the early pilot plant experiments assumed embarrassing proportions at 600 gal. of liquor per hour. When the plant was originally conceived and designed remarkably little had been published about gum-forming bodies present in liquor. Their first systematic work on the problem was done on samples of Tingley gum itself, during the preliminary run with imported liquor, mainly with a view to dissolving and clearing existing deposits and controlling future depositions. It was during these tests that the importance of oxygen was confirmed and subsequent practice detailed in the paper was guided by these early experimental results.

Gum formation from unsaturated bodies in the liquor was accentuated by concentration of the liquor to a small volume, but was probably taking place before the concentration process itself, consequent on the stripping of free ammonia and phenols. They had seen gum of a similar type which had settled out from a stripped liquor from an ordinary liquor concentration plant. It was generally similar to gum in benzole, the so-called 'tar' in spent oxide, and vapour phase gum from gas distribution systems. The oxidation and precipitation of this material, described in the paper, was the best method they had found so far of dealing with it.

On the Bolsover and Askern butyl acetate dephenolation plants, each of which handled 1,200 gal. per hour of crude low temperature carbonisation liquor, no trouble with gum formation had been experienced. Dephenolation of retort house liquor was to be used on a large new gasworks under construction in the Midlands. The principle of separation of retort house liquor was a good one. By so doing, one might concentrate the bulk of the objectionable bodies in a relatively small volume, reducing the size of subsequent purification plant. The remainder of the original liquor responded to relatively simple treatment.

Mr. **F. Littler** (North Western Gas Board) said the plant was the first of its kind. He was gratified that the plant was capable of doing what it was intended to do—namely, to produce an effluent virtually non-toxic. But at what a cost! He was shocked at the cost of operation. The production cost sheet of any gasworks would reflect a sorry tale if the net cost of effluent treatment was a debit equal to 0.3d. per therm of gas made, or 57s. per 1,000 gal. of crude liquor produced. However, the author had indicated that during the tests the plant was not operated under conditions that would produce the lowest costs. He would have been interested to have had an appreciation of the effect on operating costs if Mr. Egan's figures had been re-cast on the assumption that (1) 10 oz. instead of 5½ oz. liquor had been fed to the plant; (2) steam produced from waste heat had been available; and (3) the by-products from the plant had, in the balance-sheet, been priced a little higher. The cost of operating the plant had been debited with the cost of producing steam from solid fuel. He would be interested to have details of the power balance that was prevailing at the time of the tests on the effluent plant, and also the number of chambers at work and their method of operation. Such information would explain a great deal. Such a plant must have cheap heat available if the operating costs were to be tolerated.

Mr. **T. Nicklin** (North Western Gas Board),said that no-one would consider evaporating liquor with steam raised from solid fuel supplied for the purpose and expect the process to be a cheap one. Also, an effluent treatment scheme which demanded a particular method of works operation to render it economic might not be feasible or desirable. The situation was simplified, however, when considering an intermittent vertical chamber installation, by the fact that the cheapest gas was always obtained when the calorific value of the gas made from the chamber house was at its highest, since this implied the maximum use of capital with the lowest capital cost per therm of gas made. This followed from the fact that the volumetric output of an intermittent vertical chamber was the same no matter what the calorific value of the gas produced. If it was desired to produce gas of calorific value lower than, say, 550 B.Th.U., producer gas dilution or blue water gas dilution would have to be employed, whichever was the more economic, and neither of these processes produced an obnoxious effluent.

The two important facts which emerged from this were that, firstly, the liquor was at the strongest possible, since the minimum amount of steaming of the charge was practised, and, secondly, in view of the minimum amount of steaming, surplus exhaust steam was available from waste heat capable of satisfactorily meeting all the requirements of an effluent treatment plant.

It was clear from Mr. Egan's paper that the original conditions for which the works were designed are not being adhered to in practice, either from the point of view of strength of liquor or steam available, and he should like to know the reason for this.

The Tingley works was designed on the basis of 20,000 lb. per hour of steam from and at 212°F. being generated in the waste heat boilers of the 7 mill. cu.ft. per day I.V.C. plant.

It was necessary, therefore, to determine the price to be charged for process steam derived from waste heat. This might be considered in two ways: (1) The electrical power equivalent of the work done in an engine to be deducted; but this was unfair, since waste heat steam was available in any case and should be used in a power/process steam scheme; (2) charge process steam at the cost of additional high pressure steam required to maintain the same power output under back pressure as under atmospheric conditions. Costing under method (1) gave a process steam cost of 1s. 5d. per 1,000 lb. and under method (2) a cost of less than 6d. per 1,000 lb. when charging waste heat steam at 1s. 6d. per

1,000 lb. Applying the designed conditions to the Tingley effluent plant Mr. Egan's picture changed face completely.

Mr. **M. Redman** (North Western Gas Board) said that an outstanding point at Tingley was the poor overall removal of monohydric phenol from the raw liquor. The figures which Mr. Egan gave showed that this was not due to inefficiency of the washer itself, since the washing process might be considered to be 89% efficient when comparing the actual removal with removal under equilibrium conditions. The reason was in the phenol content of the washing benzole fed to the washing tower, which was much too high. The author referred to the importance of not allowing the temperature at the head of the phenol/benzole fractionating column to rise above 80°C. If this had, in fact, been carried out during the period of the test, then the concentration of 0.28% phenol in the washing benzole appeared to be unduly high. It should be possible to reduce the concentration to a fraction of this value. Was any appreciable quantity of monohydric phenol returning to the washing benzole stock tank from the concentrated liquor separator? The same remarks applied to the hot benzole which had been used for desorbing the monohydric phenol from the activated carbon. If either of these quantities was significant, then it might be desirable to incorporate a phenolated benzole stock tank. It was stated in the paper that at regular intervals the high boiling fractions of benzole were batch distilled from the phenols in order to give a saleable product. How did the author reconcile this fact with the maintenance of a still head temperature of 80°C., since it was impossible to remove these fractions other than by raising the still head temperature, so incurring the disadvantages of increased carry-over of phenol into the washing medium?

In the North West they had carried out laboratory work on chloride obtained from crude liquor and had not found pyridine so completely effective in removing colour. They had, however, found that methyl isobutyl ketone was a superior solvent to butyl acetate, and considered that benefits would accrue from its use. He agreed with the author that whatever the efficiency of polyhydric phenol removal it is most desirable to provide an oxidation stage afterwards.

Finally, it would be worth while increasing the amount of instrumentation on the plant in order to reduce labour costs.

Mr. **L. G. Townsend** (Liverpool) remarked that the troubles that had arisen could be traced largely to the difficulty with gum formation when the ammonia-free liquor was evaporated prior to the extraction of the dihydric phenols. This might be overcome if dihydric phenol extraction preceded evaporation; but this section of the plant would have to be very much larger, and the loss of butyl acetate would become some eight times greater. This could represent a further charge of about £1,000 per annum for butyl acetate. However, it would be a relatively small sum to ensure trouble-free operation and might provide a solution. The oxidation process as at present practised could only be regarded as an intermittent measure, since the process itself must produce a very obnoxious effluent. Regarding costs, it did not seem that a cost of between ¼d. and ½d. a therm was an excessive figure to pay for the solution of their effluent difficulties.

In the original scheme it was believed there would be adequate steam from the carbonising plant to cover the operation of the effluent plant. This had not been the case and if the process had to stand the cost of direct fired steam, clearly the overall costs must become excessive. Why was the steam balance for the works so completely different from that originally visualised? This alone affected the whole economics of the process.

Mr. **H. G. Cooper** (Simon-Carves, Ltd.) suggested that the steam consumption per 1,000 gal. was rather less than one would estimate as a practical minimum for such processes. The paper stated that a phenol content on a first run was 80% benzole by volume and at a later stage, when a batch method was employed, the benzole content was reduced to 50%. It would appear that the fractionating column on this portion of the plant was totally inadequate to obtain a decent cut between the benzole and the phenols. Regarding the production of ammonium chloride, he interpreted that the Tingley process produced ammonium chloride essentially to obtain the concentrate of noxious salts, and, to him, this seemed to be a waste of capital outlay and general maintenance to have to produce ammonium chloride of doubtful sales value. In a communication by Mr. C. Cooper and Mr. Bouch, an approach had been mentioned employing nitric acid for the destruction of thiocyanate, etc. At the moment, Simon-Carves was developing a process of simple accelerated hydrolysis of thiocyanate, and it was hoped that in the near future satisfactory information would be published regarding this. Mention had been made of contacting butyl acetate with the chloride concentrate, but it would appear from the information given that both solvent contacting equipments were insufficient for the duties. On the Continent, where butyl acetate was employed to extract phenols from raw liquors, the liquors were carbonated fully before the extraction in order to render the phenols almost as free acids, which were much more easily extractable. The extracting equipment on the plant at Camberley, where 10% of the liquor volume as butyl acetate was used to obtain 95% monohydric and 75% polyhydric extraction, employed a very efficient six bay multi-stage washer. Could similar equipment be employed with advantage on the present plant?

Mr. Egan's paper gave little information on the important problem of corrosion. In the normal method of producing concentrated ammonia liquor and in the process at Partington, where evaporation of the retort house liquor was affected, traces of tarry matter present acted as an ideal inhibitor, so that the ammonium chloride and thiocyanate solution did not attack the metals of construction. In the process at Tingley the tarry matter was removed before the concentrated ammonia liquor plant and the evaporation plant, and the solution at the base of the concentrated ammonia liquor tank and in the evaporators must have a pH in the order of 6.5. Therefore, the metals were open to attack by the very weak acid quality of the liquor. It was surprising to learn that aluminium tubes were used on the dephlegmator and that corrosion had taken place, as would be expected in accordance with the information supplied by Mr. J. Bell, of the British Sulphate of Ammonia Federation, who suggested that aluminium should not be employed when the catechol content of the liquor was more than a certain minimum value.

Author's Reply

Mr. **Egan** intimated that, owing to the many points raised, he would reply to the comments in writing. Briefly, however, the only cost really in question was that of steam. He agreed that the evaporation of liquor with steam raised from solid fuel was expensive—hence the high figure of £2 17s. per 1,000 gal. A review of the steam situation at Tingley showed the difference between the actual steam requirements and those catered for in the original design. There was a deficiency of 6,410 lb. per hour, which had to be met by Lancashire boilers. In addition to these figures, no account had been taken of the wetness of the steam at the engine and turbine exhausts. This factor could reduce the amount of low pressure steam available by a further 1,500 lb. per hour. Without effluent treatment, solid fuel steam would not be necessary. It had been concluded, therefore, that the liquor treatment plant must bear the cost of this steam. Concerning liquor strength, the liquor at Tingley normally amounted to 35 gal. per ton, the minimum which could be achieved. Mr. Nicklin had suggested that an 11 oz. liquor should be made. This is impossible in practice. He doubted whether it was possible to export sufficient steam from a carbonising plant of any description for effluent treatment, and he thought that a figure of 6d. per 1,000 lb. for L.P. steam could never be achieved.

The price obtained at Tingley over the last six months for concentrated ammonia liquor, carriage paid, was 2s. 11.45d. With the plant as designed, revenue from ammonium chloride would be *nil*, since the salt was unsaleable and an embarrassment.

Mr. Egan said Mr. Redman was rightly concerned about the efficiency of phenol removal by benzole washing. The top temperature of 80°C. was, in fact, not exceeded during the test, and the explanation Mr. Redman required was that the fractionating column was at fault.

The question of whether pyridene acted as a gum inhibitor was conjectural. It was more likely that the presence of H_2S was more important. Increasing instrumentation would neither improve operation nor reduce labour costs.

A vote of thanks to Mr. Egan was proposed by Mr. **W. S. Hubbard,** seconded by Mr. **J. M. McLusky.**

'Live Water'

means BUSINESS

in the GAS SHOWROOMS

FULL STORY ON NEXT TWO PAGES

'LIVE WATER' becomes

Immediate Success of New Parkinson 'Live Water' Washing Machine

Parkinson's new 'Live Water' Washing Machine is bringing extra sales to Gas Showrooms all over the country. Sold exclusively through Gas Boards and their accredited dealers it has proved a real winner. Its immediate and unqualified success may be traced to the following distinct advantages.

1. The revolutionary 'Live Water' washing action gets clothes cleaner and does not harm the texture of delicate fabrics *because there are no moving parts in the tub.*
2. Gas is used for heating or boiling the water. The machine is thus independent of hot water supplies.
3. Its compact size and handsome appearance.
4. Overloading cannot harm the clothes or the mechanism.
5. Power emptying and foldaway wringer.

This is what the Housewife sees

This terrific turbulent action is caused by water alone. There are no impellers or paddles to come in contact with the clothes or to occupy valuable washing space.

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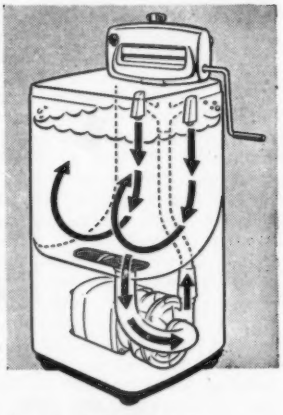
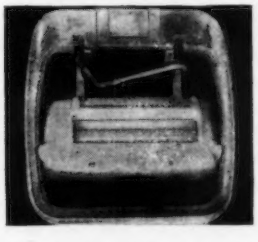
It was estimated that the Parkinson 'Live Water' Washing Machine would sell at a certain rate. Six months after the first machine was sold, sales had reached double this estimate. Production has since been doubled and plans are on the way for a further increase.



UNIQUE ACTION

The electrically driven pump in the base of the machine circulates the water which re-enters the tub through the twin nozzles below the wringer. The jets from these outlets rebound against the back of the tub. This produces a rotary action. Down, up and over, the clothes tumble in every direction whilst the water swirls through every fibre, rooting out every trace of hidden dirt.



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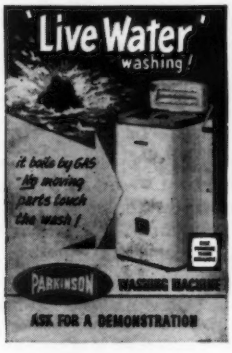

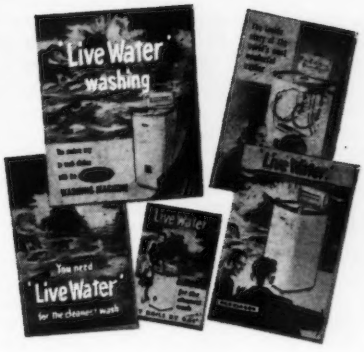

Press advertisements in your local newspapers directing the buying public to your showrooms.

16 Sheet and Double Crown Posters overprinted showing the address of the local Gas Showrooms.

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Instructional talks have been given to thousands of Gas Boards Sales Staff, Home Service Demonstrators and Gas Board Fitters to ensure that the housewife can make the best use of her machine.

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Makers of the famous Renown-Five (with the eye-level twin grill) and the Paragon Gas Cookers.

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The Washing Machine market is expanding. Gas Showrooms all over the country can look forward to a big increase in this side of their business. To take full advantage of this demand Parkinsons have plans in hand for bigger and better advertising campaigns, using large spaces in the popular Woman's Weekly and monthly magazines besides the national and provincial newspapers.

The 1955 Ideal Homes Exhibition will feature the Parkinson 'Live Water' Washing Machine. There will be demonstrations, a battery of machines in action, sales literature, etc.

Get ready for a busy year.

PARKINSON

'Live Water' WASHING MACHINE

WORKS WONDERS

A REVIEW OF THE RECENT EXHIBITION OF

Public Works and Municipal Services

LAST week's five-day Public Works and Municipal Services Exhibition, which resulted in an excellent attendance at the Grand and National Halls of Olympia, was, as its name implies, aimed at meeting the needs of local authorities. But the exhibits themselves closely resembled those to be seen at the Mechanical Handling Exhibition, which was primarily intended for contractors. The similarity was most readily seen in the large proportion of bulldozers, hoists, etc., and it was this element which made the exhibition particularly interesting to the gas industry.

Another important link with gas was the inclusion, in the Congress which is a feature of the exhibition, of two papers by representatives of the gas industry. On Wednesday delegates heard a joint paper on 'Catering—the Gas Industry and the Public Service,' by N. R. Junkison and A. S. Williams, of the North Thames Gas Board, followed by 'Recent Developments in the Production and Uses of Road Tar,' by G. H. Fuidge, of the South Eastern Gas Board.

We publish below a review of exhibits likely to be of interest to the gas engineer, and particularly the distribution engineer. This summary is admittedly incomplete, but it does, we contend, serve to acquaint the reader with some of the firms represented and give an indication of the more important new products displayed.

The exhibits of **Abbott, Birks & Co., Ltd.**, comprised a selection from the Company's specialities for contracting work, particularly for mainlaying and pipe fitting, including a number of patented and other appliances which they manufacture specially for the gas and water industries. The principal exhibits were a pipe-cutting machine shown in operation on a 10-in. main, a pipe screwing and cutting machine, 'CP' leak clamps for preventing leakage from lead-jointed mains and portable electric lighting equipment for night repairs.

Also exhibited were split collars for repairs to mains, lead-jointing tools and accessories for mains, apparatus for detecting underground gas leaks and for locating underground pipes, flexible metallic tubing for temporary connections during repairs, air testing equipment for mains and other pipe systems, pipe benders and cutters, pipe screwing tackle and vices, and sundry contractors' tools.

Hoists and Vibrators

A.C.E. Machinery, Ltd., concentrated mainly on the needs of the building industry, and examples of their wagon emptying and conveyor feeding equipment were not included. Three hoists and a new 'Ace' winch were shown, and we might mention the 'Humdinger' vibrators. These are electric and petrol driven higher frequency immersion vibrators incorporating improved special durable metals and super hard-wearing nosepieces. The pokers have step-up gears and positive oil lubrication permitting slow speed flexible drive and economy in operating costs.

Adam & Harvey (Rapid Hammer), Ltd., exhibited their fixing tools which literally shoot hardened steel bolts by means of a small blank safety cartridge into hard materials such as concrete, steel and brickwork. A wide variety of fixings are available, including nail type bolts for use with timber to concrete or brick, bolts with a male threaded head for permanent screwed fixings into concrete, brick or steel and female threaded bolts for detachable fixings.

Latest features are that the tools are practically silent and can be used even indoors with very little noise effect. A protective shield which allows for safe working even in corners and other awkward spots, is being incorporated. The larger model is now made to use $\frac{1}{2}$ in. diameter bolts in addition to the normal $\frac{1}{4}$ in. and $\frac{3}{8}$ in.

Trench Excavators

Two excavators and three mobile shovels were shown by **John Allen & Sons (Oxford), Ltd.** The 16/60 trench excavator was fitted with a 50 b.h.p. diesel motor, designed to cut trenches from 16 in. to 60 in. wide and 14 ft. deep. Rather smaller, the 12/21 excavator, fitted with 40 b.h.p. diesel motor, was designed for cutting trenches 12 in. to 21 in. wide and 6 ft. deep. This machine is now fitted with an improved type of conveyor.

The Allen mobile shovel/crane is a lorry-mounted excavator, diesel powered, capable of travelling up to 28 m.p.h. It can be used as a crane up to 5 tons capacity. It can use shovel, trench hoe, skimmer and dragline attachments. All excavator clutches are air controlled. The tractor-operated shovel can cut a trench 24 in. wide down to 8 ft. 6 in. deep; all operations are by hydraulic power. The 'Dorset' model mobile shovel is a lorry-mounted, hydraulically-operated excavator with offset boom for roadside work, curb excavations and road widening.

Hydraulic Loaders

A. Boydell & Co., Ltd., exhibited the latest developments in their range of bulk material handling equipment, among them the Muir-Hill 'Supalift' loader with 14 ft. 6 in. clearance under the lip of the tipped bucket when fully raised. This remarkable clearance was demonstrated on the stand by showing the 'Supalift' with its standard $\frac{3}{8}$ cu.yd. bucket tipped over the lip of an artificial hopper fully 14 ft. 6 in. in height. In addition the 'Supalift' features the Muir-Hill double centre three point suspension system, which provides the extra degree of stability needed to offset the increased loading height.

Also on display were the Muir-Hill 10.5 cu.ft. small industrial hydraulic loader, the LH-1. Because of its exceptionally compact dimensions the LH-1 can be worked in confined spaces, particularly where a high degree of manœuvrability is required. Among the Muir-Hill dumpers on view were the 3 cu.yd. model, the 10B, which incorporates an instantaneous gravity tip, and the Muir-Hill patented rotating seat and steering, enabling the machine to operate in either direction with equal facility.

Another impressive range of loaders was displayed by **W. E. Bray & Co., Ltd.** For example, the 'Hydraloader' has positive full-power bucket control by means of double-acting hydraulic rams at all positions of the main arms, plus a full range of easily fitted attachments, which makes this one of the most versatile of all power loaders. Bucket sizes $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$ and 2 cu.yd., and dumping height 9 ft. On exhibition for the first time was a special hoist attachment. The 'Hyaloader' is similar in operational principles to the 'Hydraloader,' and the 'Dualoader,' a recently introduced loader, combines the advantages of the 'Hydraloader' and an overhead loader in one machine. It can be employed for the specialised application of an overhead loader.

As in former years, the **British Road Tar Association's** stand took the form of an information bureau with technical representatives in attendance to give advice on all aspects of the construction and maintenance of roads with tar. Visitors had the opportunity of inspecting a number of samples of different types of tarred materials cut from roads in various parts of the country, including dense tar surfacing, which is becoming increasingly popular. Accompanying the samples were a number of photographs illustrating the roads on which the materials were laid.

Broom & Wade, Ltd., showed portable compressors from 60 cu.ft. to 500 cu.ft. F.A.D. at 100 lb. per sq. in. and a portable spray painting unit compressor displacement 20 C.F.M., working pressure 20-80 lb per sq. in., powered by a 5 h.p. petrol engine. Stationary compressors were exhibited up to 790 cu.ft. F.A.D. Among these was the new 'Broomwade' lightweight, twin cylinder air-cooled compressor, one of a new range delivering from 2.5 cu.ft.-12.5 cu.ft. of free air per minute at 100 lb. per sq. in. pressure. This range is also suitable for pressures up to 150 lb. per sq. in. Special features

of the new design are lightweight and smooth vibrationless running.

The pneumatic tools included a new road breaker, type RB.770, which is a long stroke, hard hitting tool specially designed to meet the heaviest concrete breaking duty with ease of manipulation and without fatigue to the operator. The design incorporates the latest refinements for this class of tool with a minimum of component parts.

Shovels and Dumpers

The **Chaseside Engineering Co., Ltd.,** exhibited an excellent range of loading shovels, excavators, and dumpers. The excavator was a light all-purpose machine for loading, stripping, levelling, etc. Particularly interesting was the Chaseside 3.7 cu.yd. 'Hi-Speed' dumper which was of entirely new design and had been produced with the requirements of speed and manœuvrability specially in mind. Also shown was the 3.7 cu.yd. dumper chassis, which clearly illustrated the 'built in' strength of this dumper and the Chaseside power pack incorporating the Fordson Major diesel engine.

Operators of the largest hire fleet of contractors' plant in the country, **George Cohen, Sons & Co., Ltd.,** could show on their stand only a few examples of the machines available. Among those on view was the impressive Jones KL.44 diesel driven mobile crane, mounted on crawler tracks, fitted with 50 ft. jib, maximum capacity 4 tons, and a two tool diesel engine-driven portable air compressor (110 cu.ft. capacity) mounted on four wheels and complete with concrete breakers, hoses and steels.

Also shown was a 6/8 tons capacity diesel engine driven road roller with a standard rolling width of 6 ft. 2 in., a Nash 10 diesel driven tractor dumper with a full 10 cu.ft. capacity tipping hopper, and a Nash 8 petrol driven tractor dumper of the three-wheeled type, with an 8 cu.ft. capacity tipping hopper.

Pneumatic Equipment

Demonstrations of some of the latest pneumatic tools for civil engineering and contracting work were carried out daily on the stand of the **Consolidated Pneumatic Tool Co., Ltd.** The range of exhibits embraced every type of tool used in this field, and a complete selection of air compressors.

As one example of the wide range of sizes, rock drills were graded from the miniature CP-9, which is less than 15 in. long and weighs under 7½ lb., to the full size heavily powered CP-59 in the 55 lb. class for such work as tunnel driving.

One or two compressors in the display on this stand were models not previously exhibited, and the tools and equipment included many items which had been improved or developed since this exhibition was last held.

Versatile Tractors

John Fowler & Co. (Leeds), Ltd., exhibited their well-known and impressive range of 'Challenger' tractors. Of these the Challenger 1 was powered by a Marshall twin cylinder diesel engine, developing 50 B.H.P. at 1,250 r.p.m., with six speeds, clutch and brake steering, 16 in. tracks, and exhibited with a Bray hydraulic angledozer. The 'Challenger 3' was powered by a Leyland six-cylinder four-stroke diesel engine, developing 95 B.H.P. at 1,550 r.p.m., 20 in. tracks (standard), weight 10½ tons, six speeds, clutch and brake steering. This was exhibited with Bray hydraulic direct acting angledozer and Fowler logging winch. The 'Challenger 4' was powered by a Meadows six-cylinder four-stroke diesel engine, developing 150 B.H.P. at 1,500 r.p.m., six speeds, clutch and brake steering, with a maximum drawbar pull of 28,500 lb. This was exhibited with a Blaw Knox cable angledozer and cable control unit.

Motor Graders

Two motor graders were exhibited by **Galion (Great Britain), Ltd.** One was the massive, 100 h.p. model 118, which has proved extremely successful in the past few years. The other, a newcomer, was model 603—the first British-built motor grader of its capacity.

Model 603 was a smaller grader, powered by a 50 h.p. International Harvester diesel engine. It was designed for maintenance work and for the many jobs that are normally done by big graders.

The 603 is 19 ft. 6in. long and 6 ft. 2 in. wide overall, and steering is manual. There is positive four-wheel tandem drive, and speeds range from 2 m.p.h. in first to about 18 m.p.h. in top, whilst the single reverse gear gives 3 m.p.h.

The model 118 Galion motor grader, which was also shown, is an extra heavy duty grader, with 100 h.p. diesel engine.

Centrifugal Pumps

Pumps of various types predominated on the stand of **C. H. Johnson (Machinery), Ltd.** The 3-in. portable mud pump of the diaphragm type had a capacity of 3,000 gal. per hour with suction and delivery heads of 20 ft. Two types were shown, the model IIIL, powered by 1½ h.p. Lister hopper-cooled petrol engine, and model IIID, powered by a Petter PAZI air-cooled diesel engine.

Among the portable centrifugal pumps were the 1½-in. Mk. VII, 2-in. Mk. VIIIA, 2-in. electric Mk. VIIIA, 3-in. Mk. IXA, with capacities of 3,500, 7,000 and 10,000 gal. per hour, and all of the semi-automatic self-priming type. The Mk. VIIIA and Mk. IXA incorporate a new type of seal, enabling these pumps to handle gritty and abrasive materials without harmful effect to the seals; they can also run dry without burning out. The 4-in. Mk. XII centrifugal pump, incorporating a Petter AVA2 12 h.p. twin-cylinder air-cooled diesel engine, and also a 2-in. Mk. VIIIA electric pump in operation on a high proportion of sand in water, sucking through transparent pipes, were shown.

The rest of the exhibits included dumpers, power rammers, vibrators, etc.

Flow Control Equipment

The **Keelavite Rotary Pumps & Motors, Ltd.,** has recently developed a range of fixed capacity pump/motor units with displacements up to 50 cu.in. per revolution for power transmissions from fractional to 250 h.p. at 2,000 lb. per sq. in. Certain of these units were on view.

Also to be seen were samples from the standard range of double acting hydraulic cylinders with various mounting styles. There is a choice of bore sizes from 2 in. to 6 in. with strokes up to 130 in., all suitable for a maximum operating pressure of 1,500 lb. per sq. in. Among the pressure and flow control equipment being displayed were two items of particular interest—a new series of ¼ in. pilot operated solenoid valves and a redesigned flow dividing valve. A working exhibit, staged in conjunction with Robert Cort & Son, Ltd., demonstrated a rotary gas valve powered and remotely controlled by Keelavite hydraulics.

Steel Formwork

A new, advanced, highly practical design of steel formwork for concrete construction is being exhibited for the first time by **Kwikform, Ltd.** Walls may be concreted up to lifts of 6 ft. in one operation with safety. Lifts exceeding 6 ft. can be carried out under supervision. The square butt joints of the formwork give an excellent surface, and a new dimpled system to the edges of the formwork panels reduces the cost of labour in cleaning. An important feature of this equipment is that it can be used in conjunction with timber, which can readily be fixed to the panels to make up odd sizes.

The range of the two-stage portable compressors manufactured by the **Lead Wool Co., Ltd.,** was represented by the ACD 210 four breaker machine, and the ACD 105 two-breaker machine. A selection of various pneumatic tools was also shown, with full equipment, hose and couplings, etc.

Pipe jointing materials for main-laying were displayed, comprising lead wool, leaded yarn, bitumenised yarn, ordinary spun yarn and so on, and caulking tools, chisels and cutting out tools; extruded lead wire in various sizes and sections. A display of pipe joints, jointed and cut away, showed their solidity and effectiveness. The Company's well-known main testing appliances were also exhibited.

Generating Sets

R. A. Lister & Co., Ltd., had a fine exhibit which included a selection from the well-known range of Lister & Blackstone engines. There were three petrol engines, three vapourising oil engines, and 11 diesel engines. Also shown was a horizontal single-cylinder Blackstone diesel engine, type OPI, developing 26 h.p. at 700 r.p.m. This was typical of a range from 10 to 154 b.h.p.; vertical engines go up to 600 b.h.p.

Lister electric generating sets and pumps, including the popular 'Start-O-Matic' plants, and pumps for deep and shallow wells, were also shown.

Six Tractors

On the stand of **Mackay Industrial Equipment, Ltd.,** were six tractors (three Allis-Chalmers, two Fiats and one Fordson), all fitted with various types of shovel and dozer equipment.

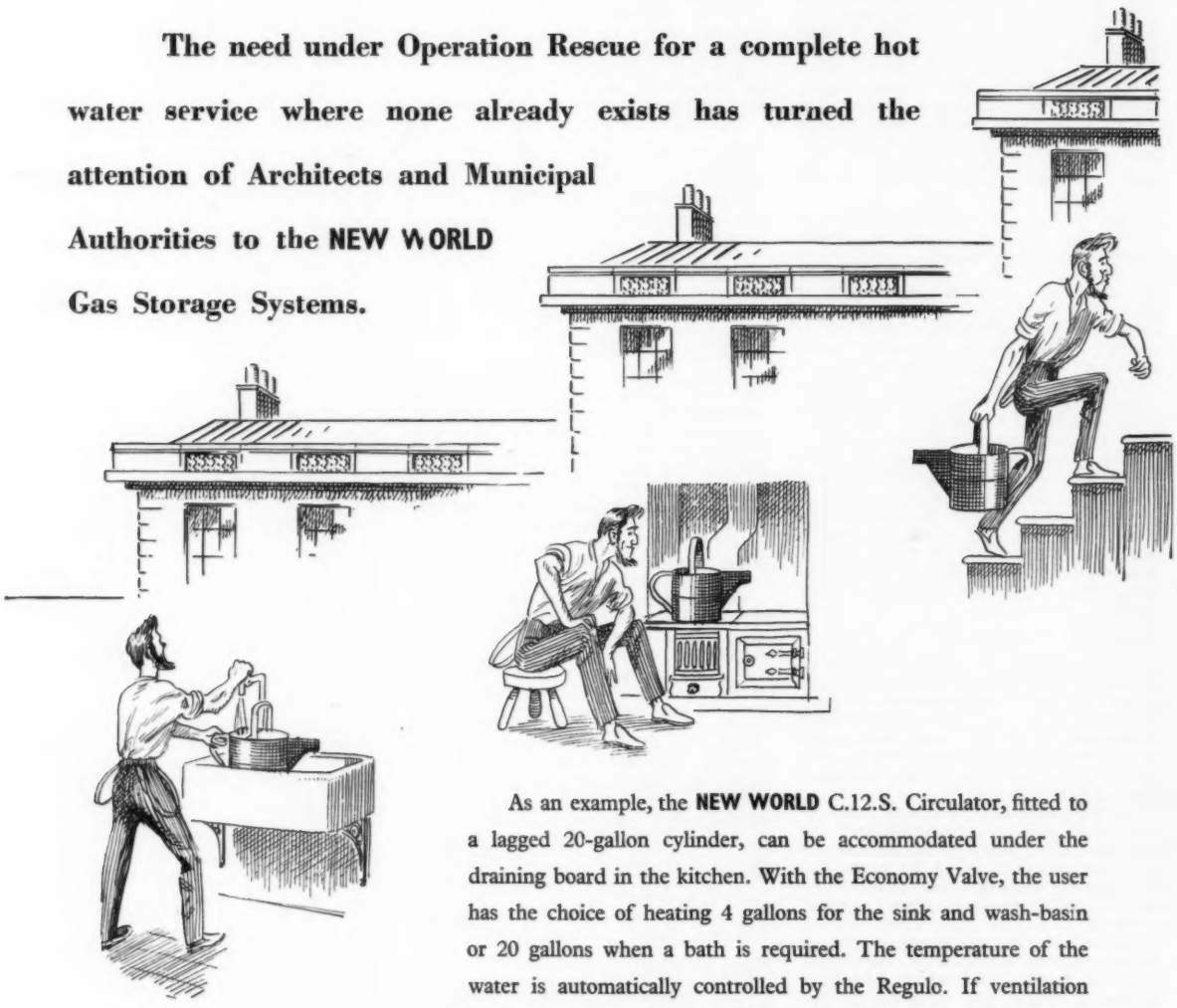
An outstanding exhibit was the 'Merton' overloader, mounted on a Fordson Major diesel tractor and fitted with a ¾ cu. yd. bucket which covered the full width of the front wheels with standard type equipment. The discharge height was adjustable from 6 ft. 11 in. to 11 ft. 2 in.

Also of interest was a 'Pescara-Muntz' P.42 free-piston compressor. This British designed and manufactured free-piston compressor is comprised basically of two groups of opposed pistons giving a direct conversion of power to compression in one movement in a straight line. It produces 105 cu. ft. F.A.D. per minute at a pressure of 100 p.s.i.

Newton, Chambers & Co., Ltd., builders of the renowned NCK excavators and cranes, exhibited the latest addition to their range—the NCK model 205. When equipped as a shovel the

NEW WORLD TO THE RESCUE

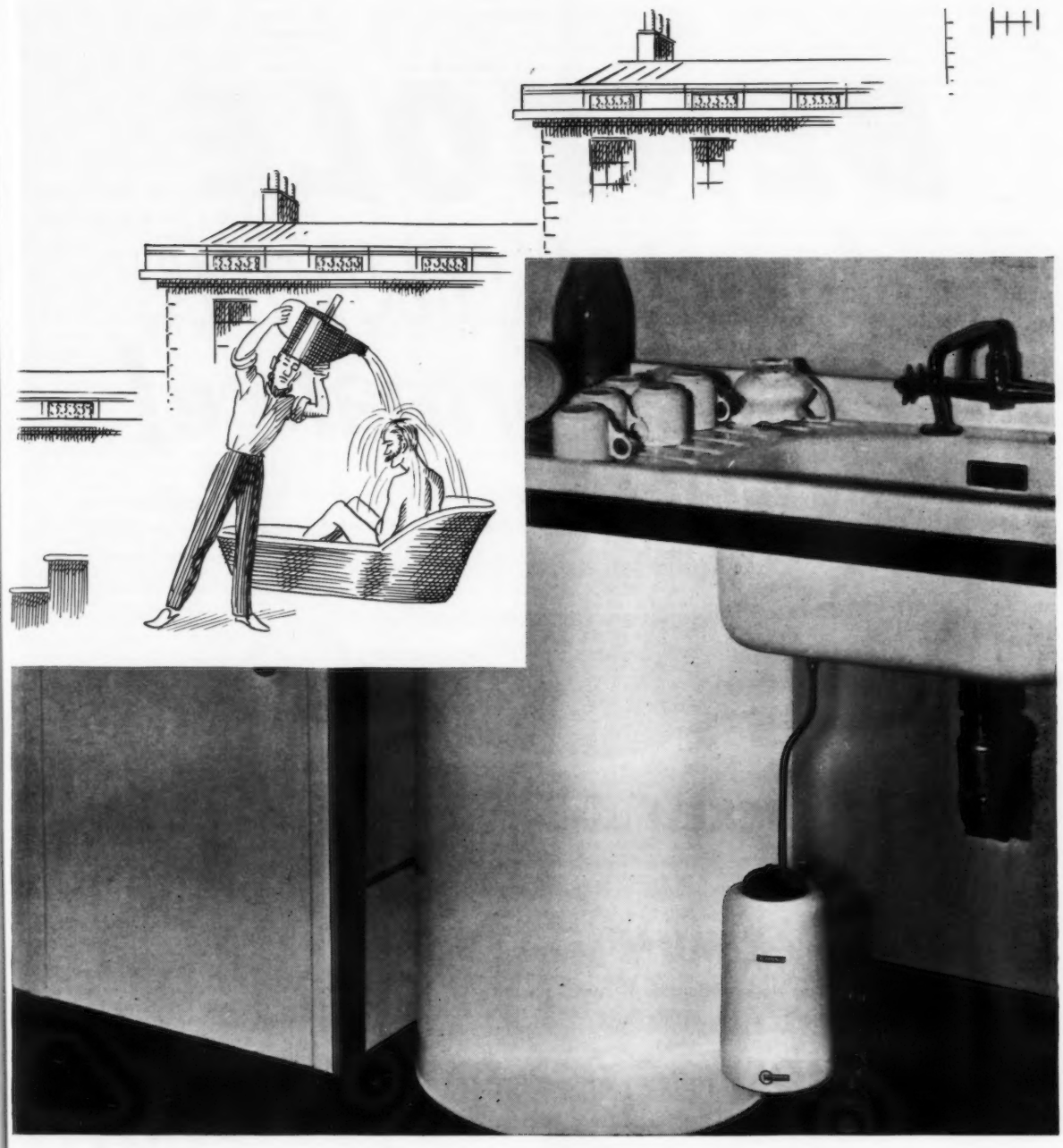
The need under Operation Rescue for a complete hot water service where none already exists has turned the attention of Architects and Municipal Authorities to the NEW WORLD Gas Storage Systems.



As an example, the **NEW WORLD** C.12.S. Circulator, fitted to a lagged 20-gallon cylinder, can be accommodated under the draining board in the kitchen. With the Economy Valve, the user has the choice of heating 4 gallons for the sink and wash-basin or 20 gallons when a bath is required. The temperature of the water is automatically controlled by the Regulo. If ventilation in the kitchen is adequate no flue is needed. This installation is being extensively used in new houses and flats, and for the modernising and conversion of old property.

A similar type of installation is available for use in an airing cupboard; and when the house contains no ball valve cistern, a combination unit complete with cistern mounted on the cylinder can be supplied.

Further information from **RADIATION GROUP SALES LTD., 7 STRATFORD PLACE, LONDON, W.1.** *Phone: MAYfair 6462*



NEW WORLD Storage Water Heaters are reasonably priced, easily fitted, economical to use, provide hot water at the same temperature, Summer and Winter, can normally be operated on the existing Gas and Water Services and require an absolute minimum of maintenance.

recommend NEW WORLD PRODUCT OF Radiation Ltd *storage water heaters*

BENZOLE boosts WINTER performance!

For QUICKEST starting

under any conditions—rely on the exceptional volatility of the Benzole in National Benzole Mixture.

For MAXIMUM power

— run on National Benzole Mixture—the most powerful motor fuel on earth.

For MOST miles per gallon

— run on National Benzole Mixture, containing Benzole—Nature's most economical fuel.

TRY IT TODAY!

The very first gallon will prove it!

NATIONAL BENZOLE MIXTURE

National Benzole Company Limited, Wellington House, Buckingham Gate, London, SW1 (The distributing organisation owned and entirely controlled by the producers of British Benzole)

NB25/O

model 205 has a dipper capacity of ½ cu. yd., and is available with dragshovel, dragline and skimmer attachments.

The model 205 is quickly convertible for crane duty, and in this application the low ground pressure, conservative rating and great stability are significant features. Boom lengths ranging from 30 ft. to 55 ft. are available, the maximum lifting capacity being 7½ tons.

Tractors and Fitments

Jack Olding & Co., Ltd., concentrated on the Vickers VR.180 tractor. The VR.180 has a fully articulated suspension, cush drive for speed with less vibration, six forward and three reverse gears, high top speed of 9.73 m.p.h., sealed lubricated tracks and unit construction for quick servicing. A constant mesh gear box enables gear changing to be made whilst the tractor is on the move. Special attention has been given to facilitating maintenance; wherever possible sealed lubrication adopted.

The supercharged Rolls-Royce 6-cylinder oil engine gives 180 belt h.p., providing the tractor with a minimum of 150 drawbar h.p. Engine speed is governed to 1,800 r.p.m.

E. Pass & Co., Ltd., exhibited machines and equipment for carrying out under-pressure connections to gas and water trunk mains and service mains. Machines for inserting ferrules, nipples, etc., under pressure were shown, and also high pressure nipple inserting and expanding equipment. Portable power and hand-operated pipe cutting machines were included, and also the 'Pass' power saw, capable of cutting 8-in. to 56-in. diameter steel and C.I. pipes. Patent joints, dies, etc., for polythene tubing were another feature.

A new hydraulic thrust boring machine with power operated pump and rotary earth boring machine for laying mains and services under roads and carriageways without interruption of traffic attracted attention.

Turning and cutting machines for asbestos cement pipes and also gunmetal saddles and malleable iron saddles for A.C. pipes formed another part of the exhibit, as did plugging and by-pass equipment for use on steel and C.I. high pressure gas mains.

Pegson, Ltd., exhibited for the first time one of the larger of their range of 'B' type gyratory crushers, the 20B. with a 20-in. wide gap and a capacity of over 200 tons per hour. They also showed their new 30 in. by 42 in. single toggle roller bearing crusher with a fabricated steel body, the 3 ft. by 10 ft. heavy duty apron feeder (shown for the first time). and will show their 36 in. by 24 in. double toggle roller bearing machine. A selection from their range of screens and pumps was on view, together with the latest type ripper and rammer.

Among the innovations on the **George Pike, Ltd.,** stand was an electric 'Geopi' lamp which has been developed for the gas boards in response to requests for a lamp of this type. It is kept on the maintenance wagons for cases where a gas main has cracked or opened and where the use of ordinary road danger lamps would be dangerous. There is a small electric bulb powered by a battery and the lamps will give up to fifteen hours light from each charge. Spare batteries and bulbs are easily obtainable.

Another interesting item was the jet conveyor, which was exhibited for the first time at this exhibition. These machines, which are easily transportable, are capable of throwing dry or wet sand, shale, gravel, grittings, earth, salt, clay, coal (not cokes), etc., distances of 6-20 yd., at 35-60 bulk tons per hour.

The **Rawlplug Co., Ltd.,** in addition to showing their extensive range of Rawlplugs, Rawlbolts, etc., exhibited some interesting additions to their Rawltools and drills. These are designed for accurate, speedy hole boring in masonry. Rawldrills for use with Rawlplugs, Stardrills for Rawlbolts, were shown, as well as tubular boring and wall-boring tools for penetrating walls, and tools for use in electric and pneumatic hammers (the Rawlplug drill-hammer converts an electric drill into a power hammer).

Tipped rotary drills for silent, speedy hole-boring of all masonry, tiles and hollow pot were also displayed.

Two diesel excavators were featured on the stand of **Thomas Smith & Sons (Rodley), Ltd.** The '21' type excavator had a standard bucket capacity of ¾ cu. yd., was mounted on crawler tracks, and was capable of operating as a rope or chain crowd shovel, dragline, dragshovel, skimmer, crane, grab crane or pile driver. Standard power unit is a Gardener 6 L.W. diesel engine. The machine was exhibited with dragshovel equipment and featured a goose neck boom of new design.

The 'Super 10' excavator had standard bucket capacity of ⅜ cu. yd. This machine can operate as a rope crowd shovel, and is convertible to take all other standard front end attachments. The power unit is a Gardener 3 L.W. diesel engine with electric starting, fitted as standard. The machine is propelled on crawler tracks and has exceptional speed when travelling. The machine exhibited was equipped with forward shovel attachment.

Spun Iron Pipes

The **Stanton Ironworks Co., Ltd.,** showed a range of spun iron pipes of 3 in. to 27 in. diameter, special castings, and flexible joints, for gas, water and sewage mains, and a mechanical demonstration of the Stanton screwed-gland flexible joint incorporating a spring cut from a length of Stanton spun iron pipe.

Samples of dry and treated blast furnace slag, machine cast and refined pig iron were shown, and the stand included coloured aerial views of the Stanton works and photographs of the products, as well as a small cinema where films of the manufacturing processes of the main Stanton products were shown.

The **Staveley Iron & Chemical Co., Ltd.,** had an excellent exhibit comprising socket and spigot cast iron pipes, castings, joints, pig iron, etc. Of the centrifugally cast pipes, those which were metal spun ranged from 2½ in. to 7 in. diameter, and those which were sand spun from 8 in. to 24 in. diameter. Vertically cast pipes were only available over 24 in. Flanged pipes were shown, and examples of pipes bitumen sheathed for use in aggressive soils. Cut-away sections through the Staveley bolt type flexible joint and Baxter pre-cast lead joint were other points of interest.

Steel Tubes

Stewarts & Lloyds. Ltd., the largest manufacturers of steel tubes in Europe, had as a special feature a large model of a street scene designed to portray the practical application of Stewarts & Lloyd's tubes as used by public utilities for a variety of purposes. The roadway was in section and showed in actual size —steel water, gas, and sewage mains, with a selection of joints and appropriate protections. Flanking each side of the model were photographs illustrating domestic, municipal and industrial uses of gas and water. The pictures were linked to the respective mains by examples of service pipes and fittings. Other exhibits included tubular steel lighting columns.

The products of Tubewrights, Ltd., an S. & L. subsidiary specialising in the design and fabrication of tubular steel products, were covered by a range of photographs.

Stothert & Pitt, Ltd., had an impressive display of concrete mixers and concrete batching plant, but the most interesting exhibits were the various models of vibrating rollers and a bituminous macadam and asphalt plant.

Asbestos Products

The main feature of the stand of the **Turners Asbestos Cement Co., Ltd.,** was a display of 'Everite' asbestos cement pressure pipes in a wide range of classes and diameters made to British Standard 486/1933. Advantages include: 1, non-corroding; 2, the very smooth bore gives high carrying capacity which is permanently maintained; 3, light but strong. Less than half the weight of cast iron, more cheaply transported, handled and laid; 4, flexible when jointed; and 5, economical in cost and maintenance.

The **Victualic Co., Ltd.,** which has specialised in flexible pipe joints for over 30 years, had a display which included joints for steel, cast or spun iron pipes with prepared ends, designed in suitable ranges for vacuum or pressures up to one ton p.s.i. In spite of the advancement in other engineering techniques the principle of the Victualic joint, although unaltered, remains popular for numerous applications. A range of malleable fittings for use with these joints was also on show, together with Victaulic hose couplings.

A prominent feature was the display of Viking Johnson couplings on plain ended pipes, with emphasis on continuous bitumen protections. These couplings are manufactured in sizes up to 100 in. diameter and have proved themselves among the most economical forms of jointing, due largely to their speed of laying. The Viking Johnson flange adapter is a very convenient fitting for use in the confined spaces usually allowed for valve or pump chambers. It permits the easy removal of valves.

Fixed Boom Conveyors

Examples of the wide range of equipment available on sale or hire from **Thos. W. Ward, Ltd.,** were attractively displayed on their stand. Among the tractors, bulldozers, cranes, excavators, etc., particular mention might be made of two items—a new portable belt conveyor and the variety of compressors and pumps available. The fixed boom conveyor, fitted with 1½ h.p. Petter air-cooled petrol engines, has a discharge height of 7 ft. 9 in. up to 10 ft., and is well suited for the loading of lorries, railway wagons, etc., being capable of dealing with up to 50 tons per hour with 4 in. as the maximum sized lumps.

F. E. Weatherill, Ltd., exhibited for the first time, the new hydraulic loading shovel with a 1 cu. yd. bucket mounted on full track and powered by a four-cylinder diesel engine, developing 44 b.h.p. at 1,800 r.p.m. This will fulfil the need for equipment comparable to but considerably lower in price than its American equivalents.

MECHANICAL HANDLING PLANT

for Coal Coke Oxide

1855 DE DEMPSTER·ELLAND 1954

We have extensive experience in the design, manufacture and erection of all types of Coal, Coke and Oxide Handling Plants and Coke Screening Plants, and invite your enquiries for individual units of plant or comprehensive schemes.

ROBERT DEMPSTER & SONS LTD
ELLAND YORKSHIRE

LONDON OFFICE: 57 TUFTON STREET, WESTMINSTER, S.W.1

IN PARLIAMENT

WITH one or two notable exceptions, the House of Commons has been in a singularly united state during the past week or two, with the Government soberly implementing schemes hatched by the Opposition when it was in power, and the Opposition giving its support, albeit with careful and constructive criticism, to various Government business. It follows, therefore, that the whip-lash of wit has had barely a crack, and the splendid disturbance of thrust and parry has seemed almost a lost art. There have been few fireworks, and Mr. Bevan's German rearmament crackers came rather late for Guy Fawkes night.

As far as the fuel industries are concerned, recent events have been overshadowed by the debate on the annual reports and statements of accounts of gas and electricity, which received editorial comment in last week's 'JOURNAL.' We do not propose to return to the matter now, save to point out the fact that almost the only criticisms made of the two industries' work during the year under review were concerned with advertising. Mr. Geoffrey Lloyd, the Minister of Fuel and Power, had, in his introductory speech, stated that the Government's policy was to encourage the two nationalised industries to compete with each other as actively as possible as a natural corrective to the disadvantages of monopoly. 'The industries,' he said, 'are historically competitive, and we should take full advantage of that fact.' He had, therefore, restored to them their freedom to advertising and to develop fully their promotional and service facilities.

This prompted Mr. Alfred Robens (Labour, Blyth) to point out that the Gas Council's account showed £229,000 spent on research and £914,500 on publicity, while the electricity industry spent £242,900 on research and £968,000 on publicity. He agreed that there should be consumer choice, but not senseless and wasteful competition or wasteful publicity and advertising, and he asked the Minister if he thought that sufficient had been spent on research. His argument was later endorsed by Mr. Richard Fort (Con., Clitheroe), who complained not that the expenditure on publicity was too much but that the expenditure on research was too little.

This question was neatly evaded in the Government reply, Mr. L. W. Joynson-Hicks, Parliamentary Secretary to the Minister of Fuel and Power, hiding himself behind the supposition that it was only advertising expenditure which was being criticised. He said: 'It is right and proper that these nationalised industries should be able to advertise. Their main object in advertising is to diffuse their load so as to improve their pay load and to inform potential and actual customers of the facilities which are available to them. We are entirely opposed to senseless or wasteful advertising.'

Funds for Fuel Efficiency

Contributions to the funds of the new Fuel Efficiency Company were discussed last week when Mr. A. M. F. Palmer (Lab., Cleveland) asked the Minister of Fuel and Power if, in view of the large sums of money which had to be provided by the nationalised fuel and power industries for the establishment of the Company, he would reconsider his decision against a levy to enable private industry to contribute to the funds of the Company. Said Mr. Geoffrey Lloyd: 'No, Sir. The Pilkington Committee endorsed this form of financing the new organisation. I am glad to say that the new organisation is already receiving fees from industry to the extent of £20,000 a year.'

At this Mr. Noel-Baker asked whether it was not a fact that this work was really on far too small a scale, but Mr. Lloyd felt it would be better to wait and see. When Mr. Palmer asked the number and value of interest-free loans made so far by the new Company to private industrial concerns for the installation of fuel-saving equipment, Mr. Lloyd replied that there was a Government scheme under which loans could be made that were free of interest for the first two years; he had so far approved 95 such loans totalling £700,000.

Concerning Coal

As usual, the availability, quality, and utilisation of coal served as a good stand-by subject, when nothing more exciting was to hand. There was, for example, the Draft Coal Industry Nationalisation (Borrowing Powers) Order, 1954, which the House approved early this month. This grants leave to the National Coal Board to borrow an estimated sum of £75,000,000 to meet expenditure in the present financial year.

Mr. Joynson-Hicks explained that from April 1, 1954, to March 31, 1955, the Board estimated that it would require to borrow for capital investment and working capital the following sums: Expenses on collieries, actual capital development in the collieries themselves, coal preparation plants, pithead baths, coke ovens and matters of that sort, the sum of £85 mill.; for the financing of the Coal Industry Housing Association, the Board reckoned that it would spend £15 mill.; for working capital, owing to increased costs, expenses and expansion of business, an additional £5 mill.; and he popped in a marginal figure of £5 mill. just in case they wanted to start on some new project. Against the total of £110,000,000 the Board estimated that it would find by means of depreciation and so forth, out of its internal resources, £35 mill. This left a balance of £75 mill.

Mr. Philip Noel-Baker (Lab., Derby, South), announcing that his party would vote for the Order, said it was not generally realised, even in the industry, that the Board was doing major reconstruction work in the mines, such as driving new level roads measuring 14 ft. by 10 ft., or 12 ft., owing to the fact that many of the seams had much more dirt than they used to have, while there were many fewer seams than 15 years ago which were wholly free of dirt. He believed more could be spent with advantage on the housing schemes, and the Opposition wished to encourage the Government in all these developments.

A few days later, the Minister, in a written reply to Mr. P. Bartley (Lab., Chester-le-Street) said that a percentage increase in the cost of imports of coal, coke, and briquettes for the first six months of 1954, over the first six months of 1953, would be misleading, because there were practically no imports in the first half of 1953. Landed values for the first six months and nine months of 1954 were £1.8 mill. and £8.8 mill. respectively, compared with £38,000 and £1.8 mill. in 1953. The National Coal Board had fully reviewed its selling price policy to industrial consumers before making the coal price changes that came into effect on May 3 last, and was receiving an economic price for such coal. Records of average prices to consumers were not kept, but it was estimated that between January 1, 1947, and October 31, 1954, average increases totalled about 44s. per ton and between March 1, 1939, and December 3, 1946, about 26s. per ton.

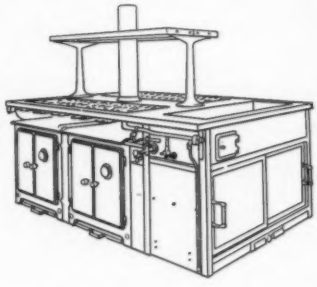
Religion and the Meter Reader

Other items of what might be termed novelty interest included the curious matter raised by Sir R. Perkins (Con., Stroud and Thornbury), who asked the Minister whether he was aware that electricity boards asked applicants for such posts as meter reader/collector for their political and religious views; and, in view of the fact that applicants felt that the wrong answer might prejudice their application, whether he would give a general direction to the Authority that questions of this kind should cease. Diplomatically, Mr. Lloyd agreed that such questions were liable to lead to misunderstanding and were best avoided, but said he had no reason to suppose that they are commonly asked. The methods adopted by boards in interviewing prospective employees were their own managerial responsibility, and a general direction on this subject would not be appropriate or necessary; however, he added that he was taking steps to see that his views were fully understood by the boards.

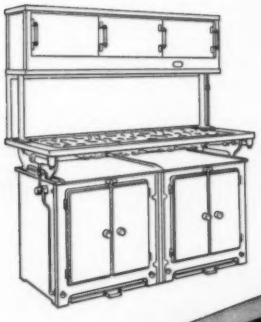
In closing we might mention that Mr. David Gammans, Assistant Postmaster-General, in replying to Mr. N. N. Dodds (Lab. and Co-op., Dartford), said that work was being done on the design of a new coin box having, among other features, a slot for three-penny pieces. However, it would be a considerable time before a new box could be introduced into general use.

Gas Range that's got itself a name for reliable service in thousands of kitchens

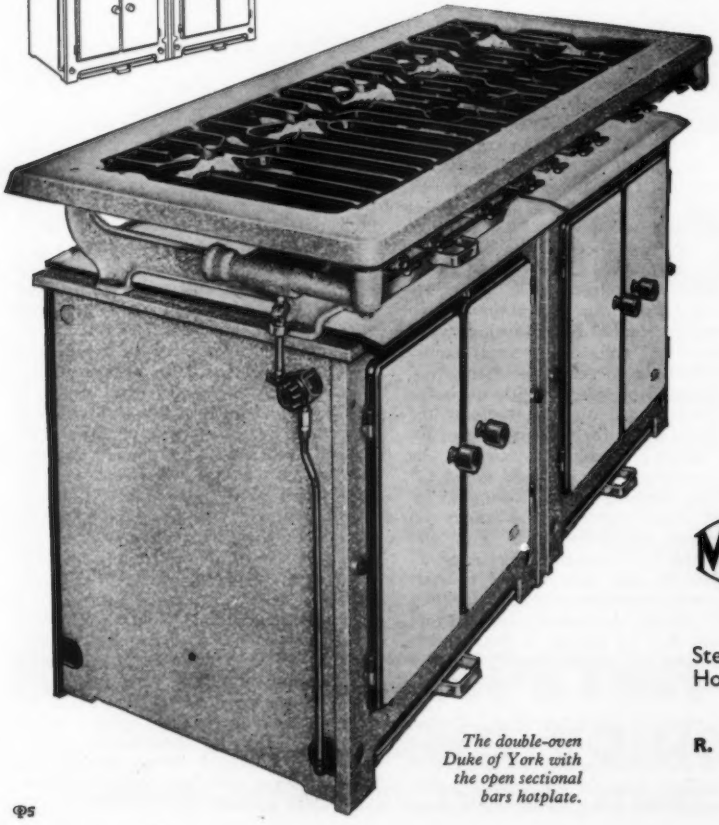
This is the Main "Duke of York" Range . . . a great favourite with chefs and with an established reputation for highly efficient cooking properties and strong durable construction. It is available in various forms to satisfy all requirements. As a "wall" type, it can be had as a single oven, either in a 24″ or 35″ internal width, surmounted by a hotplate 41″ wide. Alternatively, any number of 24″ or 35″ ovens may be joined together in battery form, with a continuous hotplate over. The Duke of York can also be supplied as a "central" range with four, six or more ovens. Potracks can be fitted on both the wall and central range types and there is a choice of "open" sectional bars or "unit" hotplates.



A central range incorporating a Bain-Marie and hot-closet.



A double-oven range fitted with hot-closet and backplate.



The double-oven Duke of York with the open sectional bars hotplate.

"our Planned Kitchencraft" Department is at your service

If you have a catering problem consult R. & A. Main Limited. Our organisation, backed by years of experience in planning and equipping kitchens of all sizes, will gladly work with you in developing your own ideas or submit plans for your kitchen.

MAIN

Gas and Steam **COOKING and SERVICE EQUIPMENT**

Steamers Hot Closets Boiling Pans Roasting Ovens Gas Ranges Fish Fryers

R. & A. MAIN LTD., LONDON and FALKIRK

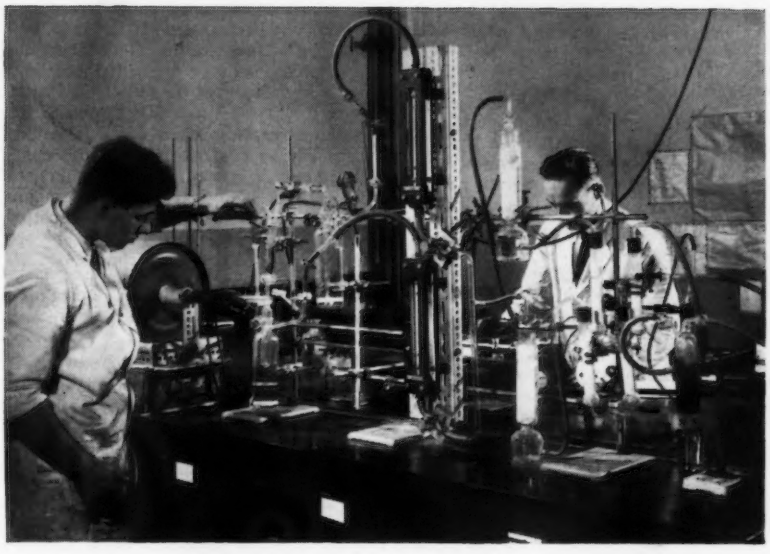
Ps

A New Central Research Department

Members of the Trade and Technical Press spent an interesting morning on November 17 inspecting the new Central Research Department which the Morgan Crucible Co., Ltd., has established at its Battersea works. The research unit is one of the most up-to-date in the country operated by a private company.

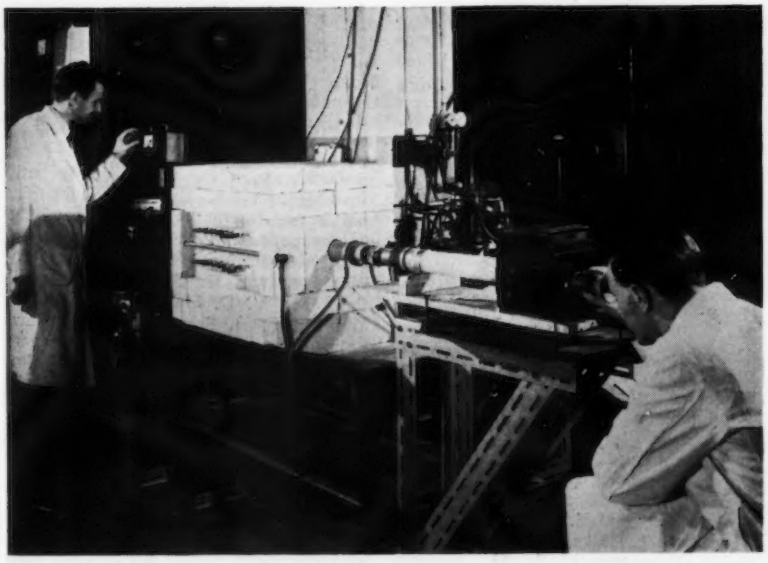
The Company started in Battersea nearly 100 years ago with the manufacture of clay-bonded plumbago (natural graphite) crucibles for mines, refineries, and foundries, followed by refractories in the shape of clay and magnesite assay ware—crucibles, mufflles, cupels, etc. It gradually widened its interests into fields associated either through common raw materials, similar processing, or associated fields of application. Today, the Company's manufactures may be classified under the following product groups: Plumbago crucibles, refractories, carbon brushes for electrical machines, carbon specialities, sintered metal products, lighting and welding carbons, carbon and graphite paints, greases and lubricants, chemical carbon and graphite, radio and electronic components, and silicon carbide heater rods.

Though Battersea has remained the largest individual unit of the group and is its administrative and technical nerve centre, a network of units has now been created, some directly controlled, and some through associated and subsidiary companies. These embrace several works in the United Kingdom, represented throughout the industrialised world by factories, sales and technical offices, agents and stockists appropriate to local circumstances. Overseas manufacturing facilities are available in Australia, South Africa, Canada, United States, Hungary, Italy, Spain, Brazil, Chile, Indonesia, Japan and Malaya.



Study of gaseous reactions at high temperatures.

The new Central Research Department embraces three groups—research, engineering and scientific services. The work of the research group derives from three main sources—the technical committees of the various company manufacturing groups; research and development contracts, from external bodies such as the Ministry of Supply; and from the Central Research Department itself. The first group accounts for about 55% of the available effort, the second about 20% and the last about 10%; the remaining 15% is utilised in day-to-day consultative services and *ad hoc* assistance to the various company developments.



Test furnace comprising Morgan M.I.28 bricks and Crusilite heater elements for high temperature chemistry research.

The research projects undertaken cover a wide range of subjects, and qualified staff are required to have a broad catholic approach to their particular science, although there is ample encouragement to make the best of individual enthusiasms. Organisation of research projects on the 'small unit' basis, whereby small teams are segregated, working in separate cells, and are not adequately aware of the work of others in the department has been avoided. For this reason there are a few large laboratories rather than many small ones. Each graduate has at least two projects to tackle, sometimes quite different from each other, and assistants are not attached rigidly to a particular graduate since they will normally be assisting more than one qualified staff member. Liaison with the technical committees of the manufacturing groups is assured by representation of the Central Research Department on each committee and by the worker responsible for a project being able to report personally to the same committee.

The work of the chemistry section is mainly inorganic or physical chemistry and typical problems include research into the properties of silicon carbide, particularly reactions with gases; investigations into the reactions which occur between the various constituents of graphite crucibles during works heat-treatments; and research into the oxidation of carbon and graphite.

A high-temperature chemistry section is mainly concerned with chemical and metallurgical reactions and processes occurring above about 1500°C. This temperature range is of great importance to the carbon and refractory sec-

tions of the Company, and the dearth of information in this field justifies a separate section. Problems include investigations into metal-ceramic bodies for high-temperature engineering applications, and work on the wetting properties of metals. Research and development into refractory turbine-blades is also being carried out.

The physics section has been largely responsible for developing special tests and test-rigs for determining high-temperature properties of refractories, metal-ceramics and carbon. Research into the electrical properties of silicon carbide is receiving attention. Modern methods of particle size analysis are employed in the studies of powdered materials. Problems of measurement of very high temperatures and of determination of reliable heat transfer data for graphite heat exchangers are also being tackled and there is a lively interest in the fundamental physical factors which influence the functioning of carbon brushes.

The engineering section has three functions: to satisfy the demands of the Central Research Department for all kinds of mechanical and electrical devices ranging from 'sealing wax and string' to precision work of the highest accuracy; to investigate any production problem arising in any of the company's manufacturing groups; and to keep abreast of and be prepared to advise on the latest production engineering techniques.

The section is staffed by a team of design engineers all of whom are works trained and hold Higher National Certificates in mechanical engineering. On the same site as the design office is a well equipped workshop staffed by time-served mechanics. Close co-operation is thus ensured between designer and mechanic which is of particular value in the early stages of prototype design.

Instruments, particularly those for measuring and recording temperature, are of exceptional importance to the Company. Temperature control is the most important feature of all its many production processes. The instrument section is in three divisions—instrument repairing and servicing (ammeters, volt meters, etc.); pyrometry, which covers installation and servicing of all temperature measurement instruments and the running of special tests when required; and electronics, including design, making and servicing of all types of electronic equipment. There is a well-equipped standards room which includes such equipment as bridges, standard lamps and a dead weight tester for pressure gauge checking.

The experimental kiln section is staffed by practical experienced kiln burners working under the administrative control of the engineering group, but under the direct technical control of section leaders in the research group. This section has the functions of testing the company's own refractories under actual conditions as distinct from conditions as simulated on a laboratory bench, evolving new designs of kilns, and carrying out production trials on new kiln processes or on ware requiring new firing techniques to improve their quality.

In the scientific services group the work of the analytical chemistry laboratory falls into three main parts: routine or semi-routine analyses as an aid to process control, non-routine investigations on samples from all sources, and the development of new methods and the investigation of new analytical techniques. Thousands of samples are examined each month ranging in nature from simple control tests to the complete analysis of clays and other minerals or the full investigation of a complex mixture of unknown materials. Most of the routine samples examined are received from the process control departments. The non-routine samples, a large proportion of which are received from the research sections, are normally analysed by senior graduate analysts.

The physical analysis laboratory is concerned with the examination of materials and products by physical methods, the main methods in general use being microscopy, spectrography, and X-ray diffraction. Other methods of less general application such as differential thermal analysis are also used. The work falls into the same three main sections as in the analytical laboratory, but with a greater emphasis on research problems.

An information section collects, stores, records, and disseminates technical and scientific information from all sources. The speedy and efficient extraction of information from many, and sometimes unexpected, sources is a specialised technique, and forms a valuable and essential part of research. This section also stores and indexes all the records of research carried out in the Department. The technical library forms part of the section.

At the close of the tour of inspection the visitors were entertained to luncheon at the Ardington Rooms, Clapham Junction, where Mr. V. C. Faulkner, the doyen of the journalists present, in thanking the Company for its hospitality, congratulated it on its very fine central research department and offered good wishes on its approaching centenary. Mr. J. Walker, Director, responded.

Long Service Recognised

Thirty-eight employees of the North Thames Gas Board, each of whom had completed 40 years service, were recipients of long service awards on October 27 at the Board's offices in Vincent Street. Mr. Michael Milne-Watson, Chairman of the Board, making the presentations, referred to the fact that long service was a characteristic of the gas industry, and coupled with that was the tradition of family service. Of the 38 recipients, no fewer than 24 had relatives who were working or had worked for the Board.

Among those receiving awards were F. E. Taylor, Local Mains Supervisor in the Board's South Western Division, and S. A. Tennant, Local Manager of the Board's North Middlesex District. Mr. Taylor worked for nine different gas companies, mainly in the Midlands and the North of England, and joined the former Windsor Royal Company in 1930. His brother is General Manager of the Timaru gas undertaking in New Zealand. Mr. Tennant started with the former Croydon Gas Company, transferring to the Lea Bridge undertaking in 1935.

The full list of those qualifying for awards is as follows:—J. Attfield, C. Clark, S. W. Draine, and E. Waters (Beckton), E. G. Fox (Bow Common), H. A. Frith and G. Nash (Brentford), W. A. Wiseman (Bromley), A. E. Pullen (Fulham), G. McDaniel (Nine Elms), H. Esqulant (Poplar), J. H. Clow and A. E. White (Southall), F. E. Holdstock (Southend), A. Hall and J. H. White (Products Works, Beckton), V. C. Eden, R. J. Perry, A. G. Shrimpton and W. D. Unwin (Transport Department), A. G. Hodges (Stores Superintendent's Dept.), H. J. Aldred and E. G. Monk (Watson House), A. J. Reeks and F. R. Willson (Stove Department), S. G. Alletson (Headquarters Division), F. E. Taylor (South Western Division), A. J. Bartlett, F. Burford, F. Hodge, H. L. Palmer and R. H. Turner (Central Division), W. J. Cooper and H. G. Parsons (Western Division), H. W. F. Haywood and S. A. Tennant (North Western Division), C. T. G. Cooke (Northern Division), H. W. Whyatt (Eastern Division).

Presentation in Wales

A certificate and cheque were presented to Mr. Thomas Humphreys on completion of 40 years service at Pwllheli by the Mayor of Pwllheli (Alderman Richard Williams). Mr. Humphreys, who commenced as a labourer at the Pwllheli gasworks in 1914 and a few years later was promoted stoker, is not retiring yet. Also present at the ceremony were the Mayoress, Mr. R. Roberts (organiser of the National Union of Municipal and General Workers) and officials of the Caernarvon group of undertakings of the Wales Gas Board.

Zurich provided a rendezvous recently for Managers of European companies within the International Division of the Minneapolis-Honeywell Regulator Co. Honeywell-Brown, Ltd., were represented by Mr. E. C. Vorlander (London), Mr. V. D. MacLachlan (London) and Mr. L. R. Price, from their Newhouse factory. They joined Managers from the branch offices in Stockholm, Amsterdam, Brussels, Frankfurt, Paris, and Zurich. The conference was organised by Mr. C. B. Meech, Manager of the International Division, and Mr. A. P. Taselaar, Manager of the International Division for Europe. The representatives covered an agenda designed to maintain effective co-operation and increase distribution of British made instruments and controls in their respective countries.

Women's Gas Federation

The tenth Branch Conference of the Women's Gas Federation was held at Caxton Hall on November 9. Opening the meeting, Dame Vera Laughton Mathews, Chairman of the Federation, welcomed the delegates, and reported that sixteen new branches had been opened. She apologised for the absence of Miss K. Halpin, C.B.E., president of the W.G.F., who had gone to Derby to speak at the inaugural meeting of the branch.

Dr. Parker, Director of Fuel Research in the Department of Scientific and Industrial Research, addressed the meeting on 'Domestic Heating and Smoke Abatement,' and illustrated his address with lantern slides. He said that about 205 million tons of coal were used in this country each year to meet the various requirements for heat and power. Of this total, 53 mill. tons, or one quarter, were carbonised at gasworks, coke ovens, and other works to provide coke and gas, and such by-products as tar, motor spirit, and fertilisers. The remainder, 150 mill. tons, was burned as raw coal, much of it inefficiently, with the discharge into the atmosphere of 2 mill. tons of smoke, ¾ mill. tons of grit and dust, and 5 mill. tons of sulphur dioxide. Though only 37 mill. tons of raw coal, or a little more than one-sixth of the total coal consumption, were burned in domestic grates, household chimneys were responsible for nearly half of the pollution of the air by smoke. He pointed out that although the smoke from the industrial chimneys always looked much worse than that from domestic chimneys, this was not always so. The smoke from the domestic chimney did not look so bad because it was diluted with so much air. In addition to this coal, householders used a few tons of coke and large quantities of gas and electricity, derived from about 22 mill. tons of coal, making a total domestic consumption of coal, direct and indirect, of nearly 60 mill. tons a year.

Since the war, continued Dr. Parker, householders used much less raw coal, and this change in the pattern of domestic fuel consumption had reduced the emission of smoke from domestic chimneys considerably. However, if this was to be almost eliminated at reasonable cost, the raw coal now used in houses must be replaced mainly by coke, and partly by increases in the use of gas and electricity. This meant that determined efforts must be made to increase the supplies of domestic coke, and that old-fashioned, inefficient grates must be replaced by modern, efficient grates designed to burn coke. During the manufacture of coke, gas was also made, and if coke and gas were to be sold at reasonable prices, there must be a well-balanced market for both products. With suitably designed appliances, the heating efficiency with solid smokeless fuel such as coke was one-third greater than with coal.

Dr. Parker was asked by a delegate what was being done to reduce smoke pollution in London, pointing out that in Manchester there were smokeless zones. Dr. Parker replied that London was following suit, and that there were already areas which were taking steps to have smokeless zones. He admitted that it was difficult for the householder to tell if he got good or bad coke, but he hoped that one day it would be made to a British Standard specification.

Asked by one delegate what he himself used in his home, Dr. Parker replied that in 1940 he had bought a ton of coal, and that he was saving most of it as it might be a valuable souvenir in 20 years time!

The meeting also discussed gas cookers, in particular the difficulty of cleaning the interior top of the oven, and other matters of interest to the housewife.

Institution of Gas Engineers

Presentation to Mr. Bernard Clarke

A meeting of the Eastern Section of the Institution of Gas Engineers was held at 17, Grosvenor Crescent, London, on November 18, under the Chairmanship of Mr. W. A. Evetts, M.C., Divisional Engineer, Watford. The resignation was accepted of Mr. G. B. L. Wilson, of Trowbridge, formerly Engineer and Manager at Kings Lynn, who had severed his connection with the industry on taking up a position at the Science Museum, South Kensington.

Mr. Evetts made a presentation of a pair of binoculars to Mr. Bernard Clarke, M.B.E., in recognition of his services as Chairman of the Section during the past year. Mr. Clarke had, said the Chairman, been a member since 1928, and was President of the former Eastern Counties Association of Gas Engineers and Managers in 1935. He had the interests of the organisation very much at heart, and it was fitting that he should have been Chairman for the past year.

Mr. Clarke, in acknowledgment, recalled that he was the last of the line of Presidents of the old Association to receive a gold medal in token of appreciation of services rendered.

Mr. H. C. Dunbar, Works Engineer at St. Albans, then gave a paper on 'Ten Years Experience with Automatically Operated Water Gas Plants,' for which he was thanked on the proposition of Mr. R. C. Wardell (Boston), seconded by Mr. K. B. Meggett (Bedford). The paper and discussion will be published in a later issue.

Manchester District

A meeting of the Manchester and District Section of the Institution of Gas Engineers was held at Huddersfield on November 5, when a paper, 'The Tingley Liquor Effluent Treatment Plant,' was presented by Mr. P. C. Egan, Chemical Engineering Assistant, North Eastern Gas Board. An abstract of the paper was published in the 'JOURNAL' of November 17 (p. 469), and the discussion is reported in this issue (p. 541).

Mr. H. Johnston, O.B.E., Chairman, in announcing the successful students who had passed the Institution examinations, said the gas industry at the present time was facing many problems, the solution of which would to a large extent depend on those qualifying to be gas engineers.

Mr. G. E. CURRIER, O.B.E., Past President, Institution of Gas Engineers, presented certificates to successful students.

Junior Gas Associations

Scottish (Eastern) Visit Armadale

Members of the Scottish Junior Gas Association (Eastern District) visited the Armadale undertaking of the Scottish Gas Board on November 6. Mr. D. J. Colvin, Divisional Controller, South East Division, Scottish Gas Board, and Mr. W. A. M. Stewart, District Manager at Armadale, received and welcomed the visitors, who inspected the carbonising plant, consisting of a modern horizontal setting, machine charged with mechanical coke handling equipment. An interesting feature of the plant was the steaming of the charge which yielded approximately an additional five therms per ton of gaseous therms.

Of recent years Armadale has become the central manufacturing station for Fauldhouse, Shotts and West Calder and the plant necessary to enable this to be accomplished was one of the first major projects to receive the approval of the Scottish Gas Board. The project included the doubling of the size of the retort house and carbonising plant, thus increasing the manufacturing capacity to 2 mill. cu.ft. per day. The arrangement of the plant permits of a further increase to 4 mill. cu.ft. per day, if necessary. The scheme also included the erection of a waste heat boiler, working in conjunction with the gas making plant; the installation of a three lift, spiral-guided gasholder of 750,000 cu.ft. capacity in a steel tank; the erection of two water tube condensers, two electro detarrers, ammonia washing plant, a set of four cast iron purifiers and oxide handling plant and oxide handling equipment; the building of a coke grading plant and reinforced concrete coke storage hoppers of 300 tons capacity.

A new compressor and station meter house was built to accommodate the whole of the compressing plant required to pump gas to the outlying districts, and new mains were laid to supply the three townships, and in addition to the neighbouring Burgh of Bathgate.

After the visit the company were enter-

tained to high tea in the local Miners' Institute, at the invitation of Mr. D. J. Colvin and Mr. W. A. M. Stewart. Mr. D. C. Elgin, President of the Association, moved a vote of thanks for the repast and to all who had given up their Saturday afternoon to make the visit an enjoyable and memorial one.

The Association has issued its syllabus for the 1954-55 session, which also includes the rules as revised at the recent annual general meeting. The main alteration in the rules consists in the admission of a new class of member. The status of 'Associate Member' may be acquired by 'any person actively engaged in the sale of gas plant or appliances who holds a recognised technical qualification or any person engaged in the gas or allied industries who in the opinion of the Council is a suitable person to uphold the objects of the Association.'

Westerns at Torquay

The Western Junior Gas Association opened the 1954-55 session with a meeting at Torquay, at which the retiring President, Mr. W. New (Plymouth) thanked all the members for their support during the past year, and welcomed Mr. F. G. Craxford (Taunton) as his successor. He congratulated Mr. Craxford on the successful way in which he had carried out the duties of Treasurer over a long period.

Mr. Craxford then took the chair and presented Mr. New with his certificate of office and with a tea trolley as a token of gratitude.

Mr. New thanked the Association for the gift and said his wife would appreciate it as much as he did and it would remind him of a particularly happy year with the Association.

A paper was read by Mr. Wharton, Chief Chemist, Staveley Iron and Chemical Co., Ltd., on Cast Iron Pipe Manufacture, illustrated by films and slides. This was followed by a discussion.

Mr. O. Pincock (Western-Super-Mare), proposed a vote of thanks to the author, and congratulated him on his paper and visual aids and said that he had just seen the best mainlaying demonstration in his experience. All too often these were under the most unfavourable conditions. It was largely due to the pipe manufacturers that pipe laying was now so efficient and, due to technical advances, we were now able to get mains to working pressures far in excess of anything which had previously been envisaged. He confirmed that it was possible under normal conditions to expect even tightening of bolts on flexible joints with 60/70 ft. lb. He agreed that intelligence of jointers was a major item. Distribution engineers had little to see for most of their efforts since mains were buried, and their efforts were seen again only when trouble was indicated.

A Visit to Glover and Main

Members of the Western Junior Gas Association, with their President, Mr. F. G. Craxford (Taunton) and accompanied by the Hon. Secretary and the Hon. Treasurer, visited the Victoria Terrace, Bristol, branch of Glover & Main, Ltd. They were received by Mr. C. Glover Clark (Sales Manager), Mr. S. Crowl (Southern Sales Manager), Mr. B. P. Reames (Representative), and Mr. H. Sparks (Branch Manager) on behalf of Thomas Glover & Co., Ltd. The visitors were first shown an exhibition of Glover & Main appliances, including Main gas cookers, fires and water heaters and Thomas Glover domestic and industrial meters. Of special interest was the new A.1. meter explained in detail by Mr. C. Charters (Production Engineer), and a comprehensive display of meter components and sub-assemblies. During the subsequent tour of the Thomas Glover shops, the visitors saw the full cycle of assembly and testing of meters from receipt of components to final painting, coin-testing, and despatch.

In an informal talk Mr. C. P. Tatham (Area Meter Examiner—Western Area), outlined the development of the official meter testing system, the equipment used in such tests, and the protection the tests afford to the consumer, the undertaking, and the meter manufacturer.

The party was afterwards entertained to high tea, following which the President, Mr. Craxford, in thanking Glover & Main, Ltd., called on Mr. A. B. Horsfield (Swindon) to propose a vote of thanks to their hosts.

Mr. S. Crowl, replying, said how pleased he and all his colleagues were that the visit was so well enjoyed and appreciated.

Mr. C. Charters (Thomas Glover & Co., Ltd.) demonstrates the A.1 meter to members of the Western Juniors Gas Association, during their visit to Glover & Main's Bristol branch. Left to right around table: S. W. Hayes (Barnstaple), R. E. Pockett (Cheltenham), K. G. Pemberton (Torquay), O. Pincock (Distribution Engineer—Weston-Super-Mare and Taunton Division), R. Firth (Bath), and W. A. Chard (Engineer and Manager—Gloucester).

Gas and Opera

The windows of the city showroom of the Cardiff undertaking of the Wales Gas Board can be considered to be a focal point in the communal life of the city and invariably attract attention because they reflect the varied aspects of the life of the city. The most recent example of this co-operation was the presentation of an attractive window display in conjunction with the Welsh National Opera Company's fortnight of opera. Included in the repertoire was Verdi's Sicilian Vespers which had not been presented anywhere in this country for 95 years.

The presentation of this opera on the first night of the season brought many people of note to the city, including the Earl and Countess of Harewood, Lady Barnes and Sir George Barnes, Head of Television, Mr. John Christy, of Glyndebourne, in company with music critics and music lovers from all over Great Britain. The window illustrated a costume worn by one of the members of the cast of Sicilian Vespers. The Lord Lieutenant of the County, himself an enthusiastic opera goer, took several small parties of visitors to see the display.

For Leisure Hours.—A man with a happy sense of something accomplished and more to follow is Mr. Fred. B. Cooper, Hon. Secretary of the Scottish Gas Board's Social Club. He and his enthusiastic committee now have commodious premises at 22-24, Albany Street, Edinburgh, formerly used as a hotel and dancing academy. The premises are being put into shape, and it is hoped to have them ready by the end of next month. There are already over 800 members, drawn not only from the Edinburgh Division, but from the staffs of the Scottish headquarters and South Eastern Division.

ALL POWER TO HIS ELBOW

Prominence is given in the current issue of the C.A.C. Magazine, house journal of the Cape Asbestos Co. and its subsidiaries and associates, to the work of N.I.F.E.S. (the National Industrial Fuel Efficiency Service), and particularly to the work of Dr. W. Angus Macfarlane, its General Manager, who, it says, agrees with the view that the demand for energy must increase considerably over the next 20 years, so that the difference in the amount of power available per worker here and in America may be made up. In some industries the productivity of the British worker is about 50% of that of the American worker, and this is almost exactly matched by the difference in horse power available per worker. An increase in productivity will demand a commensurate addition to the power supplied to industry and with the difficulty of augmenting coal supplies and the growing cost of fuel from boiler houses, it is essential to use all fuel in the most efficient way possible.

Dr. Macfarlane believes that a down-to-earth policy of providing individual firms with information and advice, coupled with co-operation from consultants and specialist heating engineering firms, will produce the best results.

It is not a matter for exhortation, but for sound practical help. Admittedly firms will have to know where to come and some will require stimulating, but if the Government's offer of loans on favourable terms for adapting or replacing equipment can be shown to suit widely varying conditions, he believes that the drive for fuel efficiency may become an urge throughout industry.

Loan Scheme Revised

In June, 1953, the Government revised this loan scheme. Firms could apply for loans to cover expenditure on the installation (including capital cost) of approved fuel saving equipment or to insulate their factories. Loans would not normally exceed £30,000; repayment could be spread over the period during which the equipment was being written off for taxation purposes, but subject to a maximum period of 20 years. Interest is charged at commercial rates, save that loans are interest free for the period ending two years after the equipment has been installed, as determined by the Minister of Fuel and Power.

This Government loan scheme has been severely criticised from many sides, none more strongly than by the Structural Insulation Association whose Chairman, Mr. A. H. T. Broderick, wrote to the Chancellor of the Exchequer on January 6 of this year, reiterating his point that owners of industrial buildings were discouraged from installing fuel-saving insulation because of taxation, and making the point that if they were allowed to charge such expenditure against revenue for tax purposes in the year in which it was incurred, the Government would cover the amount lost in taxation in that year by higher revenue within the next few years, and the country would benefit by having more coal available for export.

The Chancellor, however, did not see fit to make any alterations to the scheme on these lines in his Budget.

It would seem, says the journal, that the S.I.A.'s contention that full advantage has not been taken of the scheme is borne out by the following figures supplied by the Ministry of Fuel and Power regarding the position at April 7 this year:

Applications received (150), £850,918; with drawn or rejected (72), £347,196; under consideration (42), £231,614; finally approved (36), £272,108.

'The Government loan scheme is obivously not working. It is in the interests of the Cape Asbestos Group that it should. We look to N.I.F.E.S. among other bodies to persuade the Government to give it life and bring a sense of urgency to the nation-wide drive for thermal insulation and heat conservation. Nothing less will bring about anything like achievement of what the Chancellor has described as "this vital purpose".'

Housing Cut May Mean no Cookers

There may be neither cookers nor wash boilers in new council houses built in Lanarkshire in future. The Secretary of State for Scotland has told the county council that it must economise, and one of his suggestions is that cookers and wash boilers should be omitted. He says that both of these appliances could be easily hired if arrangement were made for the provision of the necessary connections.

The matter arose out of a decision by the county council to accept an offer by R. Morgan & Co., Hamilton, amounting to £58,329, for the building of 40 traditional houses at Cleland. A letter was sent by the Department of Health, intimating that the tender costs of the houses appeared to be high in comparison with the general level of tenders in that area. The Secretary of State, therefore, did not feel justified in approving them.

It was reported to the council that the Chairman of the Housing Committee, Councillor Edward Daly, had instructed that schedules for the houses should be re-issued and fresh tenders invited.

Before Discussing the cooking facilities to be made available on their new Brookhouse Farm estate of nearly 300 houses, members of the Eccles (Lancashire) Council Housing Committee inspected up-to-date gas cookers displayed in one of the North Western Gas Board's new mobile showrooms. The showroom, which brings the latest gas appliances directly to housewives living on isolated housing estates in the greater Manchester area, was driven up to the Eccles Town Hall for the Committee's inspection.

Plymouth's New Centre

Among major buildings now in their initial stage in Plymouth's new City Centre is Radiant House, divisional headquarters of the South Western Gas Board. The building, the architects of which are Whinney, Son, and Austen Hall, of London, and the contractors Pearn Brothers, of Plymouth, will be in keeping with the customary white Portland stone layout of the City Centre, but a touch of colour will be added by slate facing below the windows in the lift tower. It is hoped to have the building ready for use by Christmas next year.

Describing Radiant House the Divisional Manager, Mr. J. W. Dean, said it will be four stories high with frontages of about 100 ft. to the Derry's Clock roundabout and to Union Street. It will accommodate the entire staff of the new Plymouth and Cornwall Division, which is at present working at Mutley Plain and at Fox's Field, Cattedown.

The home service department, which is playing an increasingly important part in the Board's activities, will be given a place in the new building, where advisers will have facilities for conferring with consumers. The arrangements include a demonstration theatre to hold 240 people, a showroom in which live displays of water heating can be held, and a space for displays of commercial equipment. Central heating and water heating will be by gas, the plant being at the top of the building. This will be designed to allow quick changes from one type of boiler to another, by which means it is hoped always to have the most modern demonstration boilers actually at work in the building.

Piling, which was begun on the site some two years ago, has been completed, and the ground floor beams are being put into place.

When the excavations were in progress remains of an old brick culvert, portions of which have been found in other sites in Royal Parade, were uncovered. This is reputed to be the leat which Sir Francis Drake constructed in order to bring Dartmoor water for the use of the people of the Plymouth of his day, for which engineering feat he received the sum of £100 from the town.

Physical Society Exhibition

The 1955 Physical Society Exhibition of scientific instruments and apparatus will be held in the New Hall of the Royal Horticultural Society, Westminster, from Monday, April 25 to 28. It is anticipated that about 140 exhibitors will take part. Exhibits will include scientific instruments and apparatus newly developed or in the process of development and pieces of research apparatus which make use of physical principles in ways hitherto unexplored. Among exhibitors of this type of apparatus will be a number of university departments and Government establishments. The exhibition will also include stalls showing new scientific books and journals by a number of publishers.

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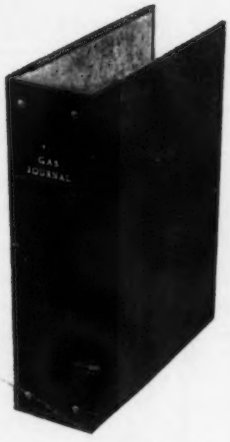

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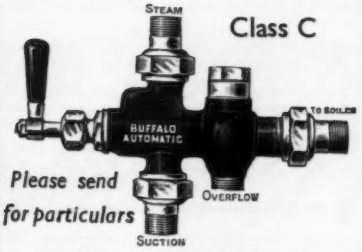

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

DRAUGHTSMEN required, preferably with experience in Steel Structures, Pipework, Foundations or Refractories. Write, stating full particulars and salary required to: The Chief Draughtsman, Furnace Department, The Wellman Smith Owen Engineering Corporation Ltd., Parnell House, Wilton Road, London, S.W.1.

FLAVELS of Leamington have a vacancy in their Research Laboratory for a PHYSICIST or PHYSICAL CHEMIST, mainly connected with gas water heating. University degree or equivalent desirable but not essential. Apply, stating salary required, to the Technical Director, Sidney Flavel & Co. Ltd., Leamington Spa.

SOUTH EASTERN GAS BOARD

TWO ASSISTANT CHEMISTS,

DIVISIONAL LABORATORY AND PORTSLADE WORKS, BRIGHTON, SUSSEX DIVISION

APPLICANTS must possess the General Certificate of Education in Chemistry at Ordinary or Advanced level.

Preference will be given to those who have experience in the testing and analysis of gas and by-products.

Salary within Grade V (Provincial 'A') £500-580 per annum.

Applications in writing, quoting reference V10/454 and giving full details, should reach the undersigned not later than fourteen days after the publication of this notice.

R. J. McCRAE,
Personnel Manager.

Katharine Street,
Croydon.

(*Classified advertisements continued on page 562*)

APPOINTMENTS VACANT (ctd.)

NORTHERN GAS BOARD

WESTERN GROUP

FOREMAN GAS FITTER (Working) required at the Keswick Undertaking of the Northern Gas Board. Rates and conditions in accordance with the N.J.S.C. Intermediate Grade IV, Provincial 'A', £435-£480 per annum.

Applicants should be First Class Gas Fitters and have good Distribution experience. Ability to drive a motor vehicle will be an advantage.

Applications, stating age and experience, together with the names of two referees, to be sent to A. Field, Esq., Divisional General Manager, 19, King Street, Penrith, on or before November 30, 1954.

A. R. CROFT,
Group General Manager.

November 15, 1954.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
INCOME SUPERINTENDENT—
GRIMSBY GROUP

(Amended advertisement)

APPLICATIONS are invited for the above post which covers overall responsibility through supervisors for all consumers' records and accounts.

The duties include responsibility for all billing operations for gas, fittings, residuals and hire purchase transactions and also control of the prepayment meter section. The Group has 40,000 consumers and experience of maintaining consumers' records by accounting machines is desirable.

The appointment will be made within Grade A.P.T. VIII of the National Salary Scales for Gas Staffs (£625/705). The position is pensionable and the successful applicant may be required to pass a medical examination.

Applications stating age, qualifications and experience, and giving the names of two referees, should be addressed to the Group Manager, East Midlands Gas Board, Sheepfold Street, Grimsby to arrive not later than December 4, 1954. Applications received in response to both this and the original advertisement will receive consideration and those who have previously written need not re-apply.

BERNARD CLARKE,
Divisional General Manager.

Lincoln,
November 18, 1954.

EAST MIDLANDS GAS BOARD

LINCOLNSHIRE DIVISION
TECHNICAL ASSISTANT—
GAINSBOROUGH GROUP

APPLICATIONS are invited from suitably qualified persons for the above appointment.

Applicants should have a sound knowledge of the operation of continuous vertical retorts and C.W.G. plant and should preferably hold the Ordinary Grade Certificate in Gas Engineering (Manufacture) or equivalent qualification.

The commencing salary will be within Grade A.P.T. V of the National Salary Scales for Gas Staffs (£500/580). The post is pensionable and the successful applicant may be required to pass a medical examination. A very small flat is available on service occupation agreement at a reasonable monthly payment.

Applications stating age, qualifications and experience, and giving the names of two referees, should be addressed to the Group Manager, East Midlands Gas Board, North Street, Gainsborough to arrive not later than December 7, 1954.

BERNARD CLARKE,
Divisional General Manager.

Lincoln.
November 16, 1954.

SCOTTISH GAS BOARD

DUMBARTON/HELENSBURGH DISTRICT
TECHNICAL ASSISTANT

APPLICATIONS are invited for the above post at Dumbarton Gas Works.

This post is graded within the Scale Provincial 'A' Grade VI-VII (£530-£665) with placing according to ability. Candidates should possess a Higher Grade Certificate in Gas Engineering (Manufacture), or similar qualification, and should have the experience necessary to operate modern Carbonising and Ancillary Plant.

Applications, appropriately endorsed, stating full personal particulars and details of education, training and experience, should reach the undersigned not later than December 8, 1954.

ALEXANDER MCFADYEN,
Engineer and Manager.

Gas Works,
Dumbarton.

SCOTTISH GAS BOARD

NORTHERN DIVISION—
INVERNESS DISTRICT
ASSISTANT MANAGER

APPLICATIONS are invited for the position of ASSISTANT MANAGER of the above Undertaking.

Candidates should possess the Higher Grade Certificate (Manufacture) of the Institution of Gas Engineers and have experience of Vertical Retorts and control of works plant generally.

The salary applicable to the post is Grade VIII (Provincial 'A') of the National Salary Scales—£625-705 per annum. Placing in the scale will be in accordance with qualifications and experience.

Candidates should state if they meantime hold a superannuated position. The successful candidate may be required to pass a medical examination.

Applications giving particulars of training, experience and qualifications, together with *copies* of two Testimonials should be addressed to the undersigned to arrive not later than Monday, December 13, 1954.

Gas Works,
Manse Place,
Inverness.

JOHN FORD,
District Manager.

November 16, 1954.

NORTH WESTERN GAS BOARD

APPLICATIONS are invited for the following pensionable appointments:—

CENTRAL LANCASHIRE GROUP
STATION ENGINEER—
HIGGINSHAW WORKS, OLDHAM
(Commencing salary of £1,300 per annum)

The successful applicant will be responsible to the Group Production Engineer for the operation and maintenance of the station.

The carbonising plant consists of Woodall-Duckham continuous vertical retorts with a daily capacity of 8¼ million cu. ft. and new ancillary plant is scheduled for installation.

Candidates should be corporate members of the Institution of Gas Engineers, and have had experience in the control of vertical retorts.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B. (Central Lancashire Group) Gas Offices, Dane Street, Rochdale, within ten days.

MANCHESTER GROUP
DRAUGHTSMAN—INDUSTRIAL SALES
(Salary within Grade A.P.T. VII-VIII—£585/705 per annum)

Applicants should have had experience of the design of industrial gas appliances and layout of installation work, furnace construction, heating and ventilating engineering.

Detailed applications, giving the names of two referees, should reach the General Manager, N.W.G.B. (Manchester Group), Town Hall, Manchester, within fourteen days.

NATIONAL COAL BOARD

APPLICATIONS are invited for the post of ASSISTANT COKE OVEN MANAGER of the new Lambton Coking Plant in Durham. Good technical qualifications and experience on a modern coke oven and by-product plant essential, knowledge of gas producers and purification plant desirable.

Applications giving full details to be submitted within fourteen days of publication to Carbonisation General Manager, National Coal Board, Durham Division 'F' Floor, Milburn House, Newcastle-upon-Tyne, 1.

WEST MIDLANDS GAS BOARD

WARWICKSHIRE DIVISION
ASSISTANT PRODUCTION ENGINEER,
FOLESHILL GAS WORKS, COVENTRY

THE DUTIES will entail supervision of Coal Gas, C.W.G. and ancillary plants of a total capacity of 25 million cubic feet per day.

Candidates must hold, as a minimum qualification, the Higher Grade Certificate (Manufacture) of the Institution of Gas Engineers.

The salary will be within Grade XI (£740-£865 per annum) of the salary scales for Gas Staffs.

A self-contained flat will be available at a reasonable rental.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. A. Allen, Divisional General Manager, West Midlands Gas Board, Warwickshire Division, Gas Offices, Gas Street, Coventry, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

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FOR SALE FROM STOCK. Steel Framing for Building 91 ft. wide (in one clear span of 81 ft.) × 192 ft. long × 25 ft. to eaves. Doors, ends, glazing as required. Write for particulars, etc., Bellman Hangars, Ltd., Terminal House, London, S.W.1.

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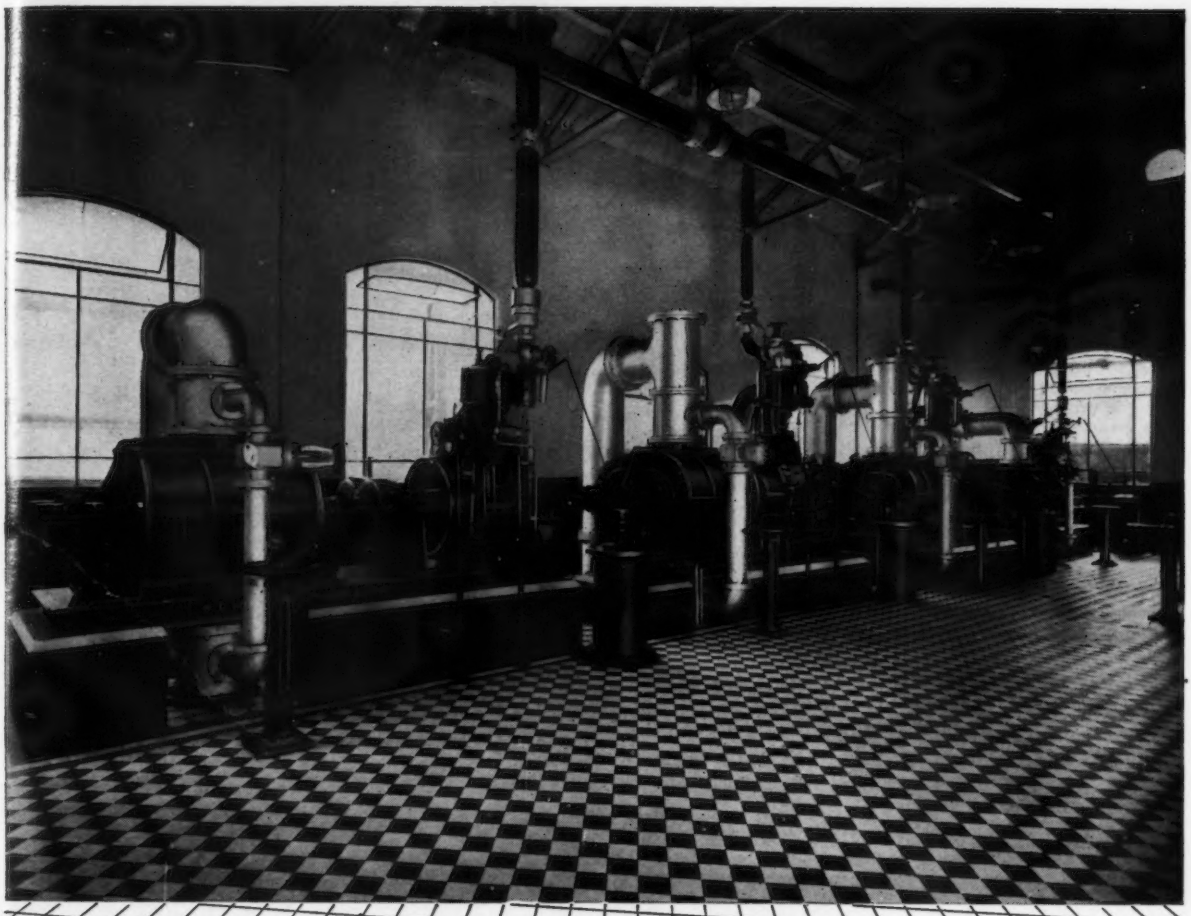

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General Manager, North Western Gas Board, St. Helens.

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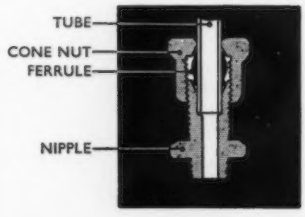
DIRECT COUPLED COMPRESSORS (see *illustration right*) *are fitted with automatic internal by-pass valves and lubrication systems. They are direct coupled to Keith Blackman motors. Type OA compressors in this range occupy a floor space of only 18" x 7½".*
CAPACITY RANGE: *100 to 750 cub. ft. of gas or air per hour at 3 lbs. per sq. in. pressure.*

TYPE 4 COMPRESSORS (*not illustrated*) *are also fitted with automatic internal by-pass valves and lubricators. The complete unit includes motor and drive on a common bedplate, all of Keith Blackman manufacture.*
CAPACITY RANGE: *500 to 20,000 cub. ft. of gas or air per hour at 3-5 lbs. per sq. in. pressure.*
AREA OCCUPIED: *from 9¼" x 16½" to 61" x 27".*

DID YOU KNOW?

KEITH BLACKMAN have been making compression joints for many years and the present design embodies features developed as a result of this long experience. *Notice that the shape of the ferrule is such that the joint is made without unduly stressing the tube.*



serving to burn

Note: the four burner heads (right) are for high pressure gas, or low pressure gas and air blast.

LEFT: "Fishtail" type burner *with two-armed stamped pattern injector for heating liquid in tanks by submerged combustion tubes. For use with low pressure gas supplies.* ***Size Range:*** *1", 1¼", 1½", 2" and 2½" outlets.* ***Capacity Range:*** *45-280 cub. ft. of gas per hour.*

Brass non-blow-off head types: *deal with 5 to 10 cub. ft. of gas per hour.*

Stainless steel, "F" type head, burner: *deals with 8 cub. ft. of gas per hour.*

Perforated head type burner: *deals with 10 to 15 cub. ft. of gas per hour.*

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INDUSTRIAL GAS EQUIPMENT

524

VISCO FUME REMOVAL

This photograph illustrates "Visco" Fume Removal equipment at the Whitehead Iron & Steel Co. Ltd., Newport, Mon. The hot oil fumes generated during rolling are drawn off through the large hood above the reel, and additional hoods between the stands and pass into an underground suction duct to an oil eliminating chamber. From this the fumes emerge, cleansed of oil and vapour, to atmosphere.

Consult us on your Fume Removal Problems. Write for List No. 532.

THE VISCO ENGINEERING CO., LTD., STAFFORD ROAD, CROYDON. 'Phone CROydon 4181/4

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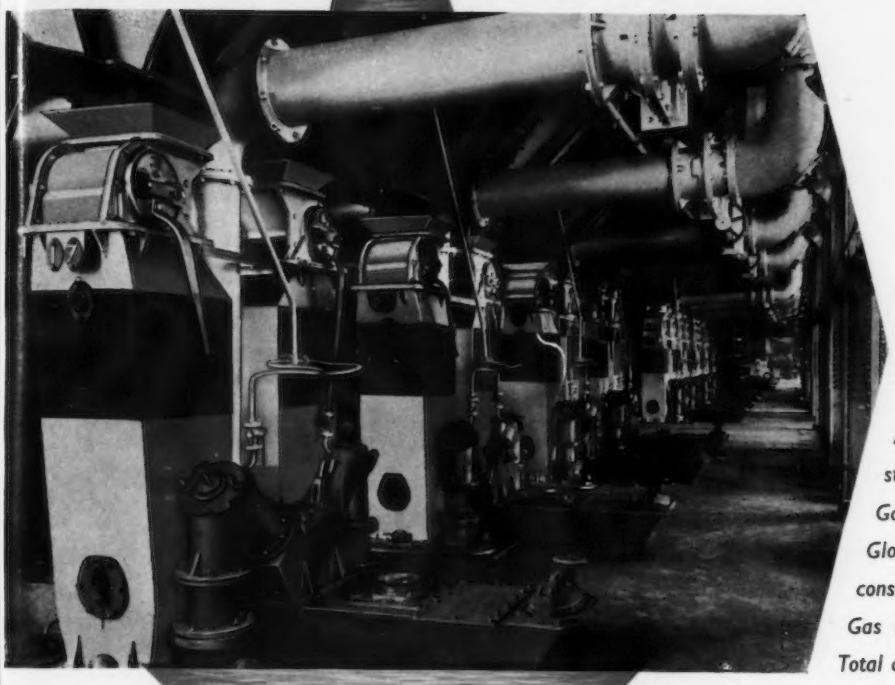
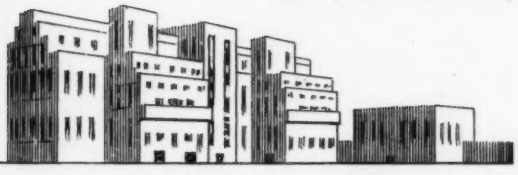
PROGRESS AT BRISTOL



A view of the retort charging stage at Bristol, Stapleton Road, Gasworks, where 64 of the 128 Glover-West Vertical Retorts under construction for the South Western Gas Board are now in production. Total daily capacity of the plant will be 10,000,000 cu. ft per day.

The retorts are heated on the "Balanced Heating" principle and fuel gas is supplied by West's "Hot-Gas" Mechanical Producers.

(Photograph by courtesy of the South Western Gas Board)



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